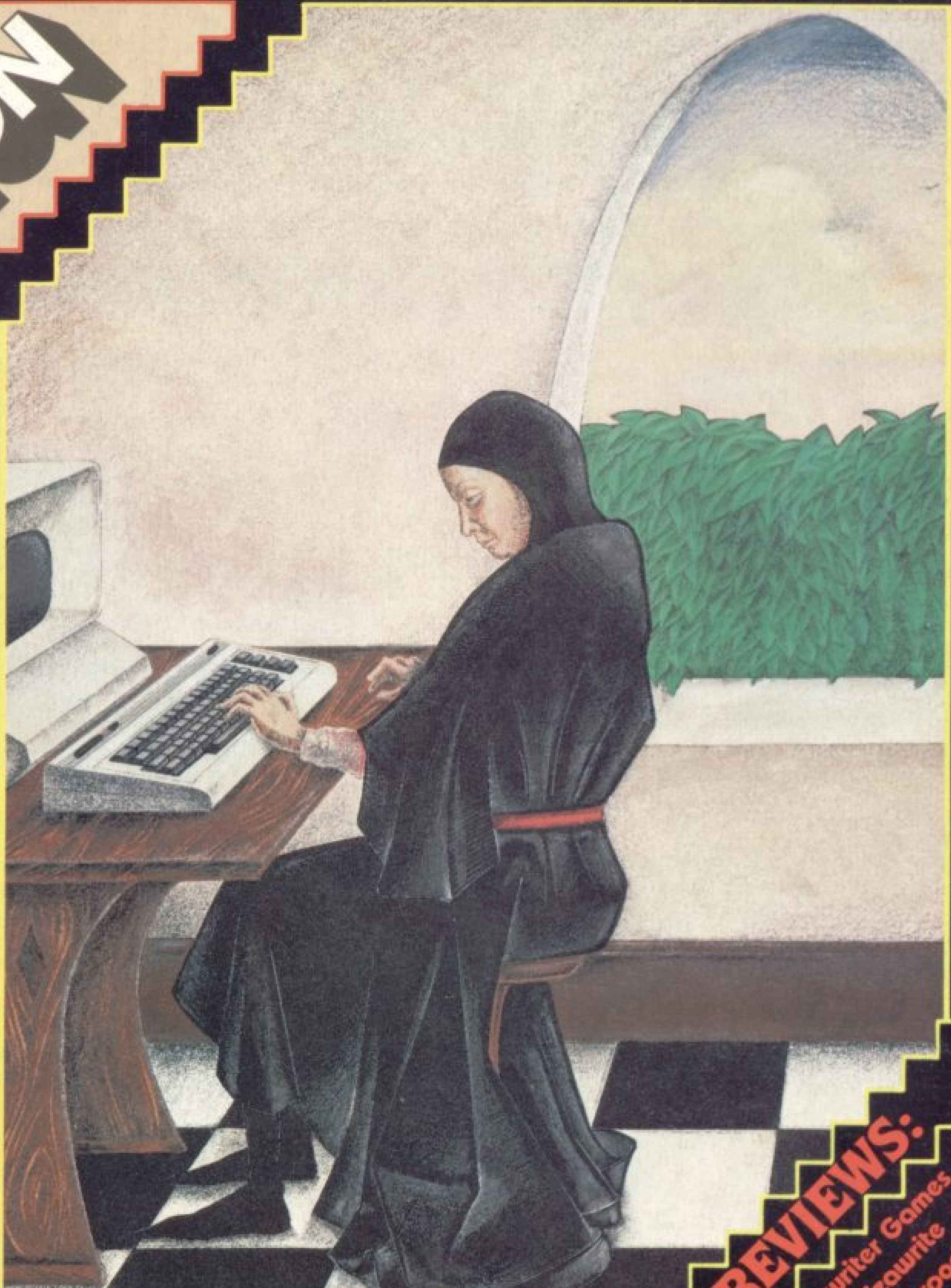
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Incorporating Vic Computing Volume 1 Issue 5 February 1984 UK Price 85p

INSIDE PULLOUT
Deals For Readers

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- Blopper
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- 64 Sprite Editor
- Real Vic Music
- Tommy's Tips
- Gail Wellington
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REVIEWS:
Codewriter Games
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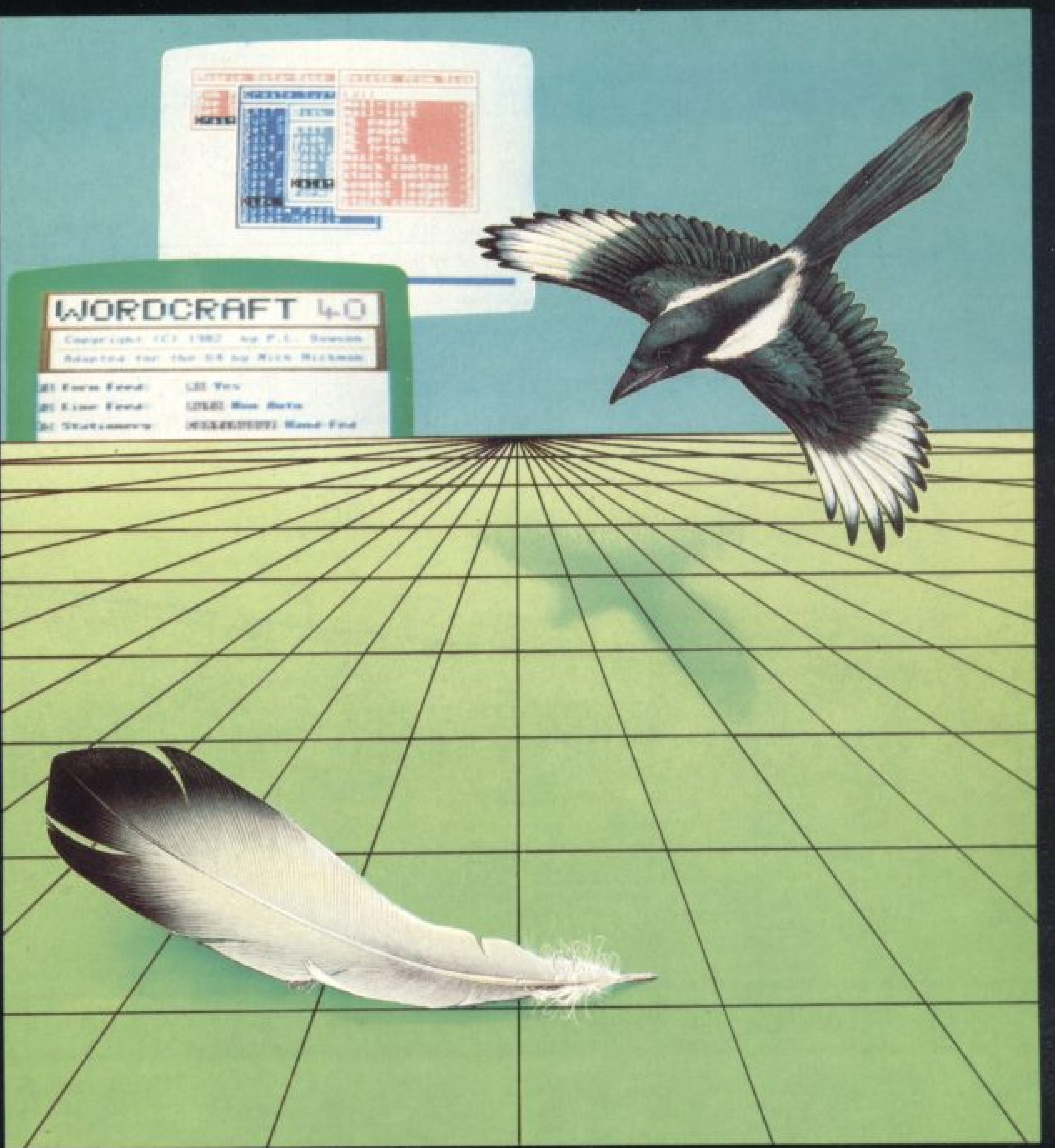
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She runs Commodore's Software Department in Slough, so she decides what products Commodore will be trying to sell you. What's she like? And what *really* happens there?

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The Bridge to Forth — 35
Start of a new regular series on one of the alternatives to Basic. There are lots of Forth implementations for the Vic; Richard Hunt will be reviewing them all.

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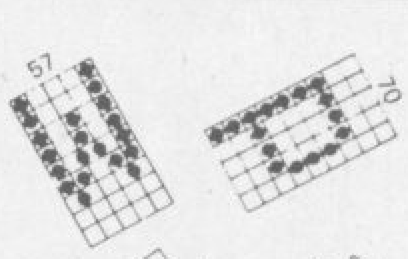
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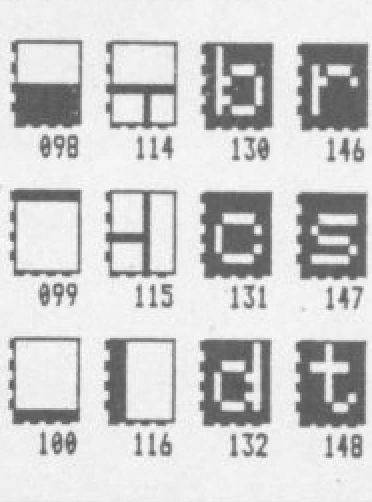


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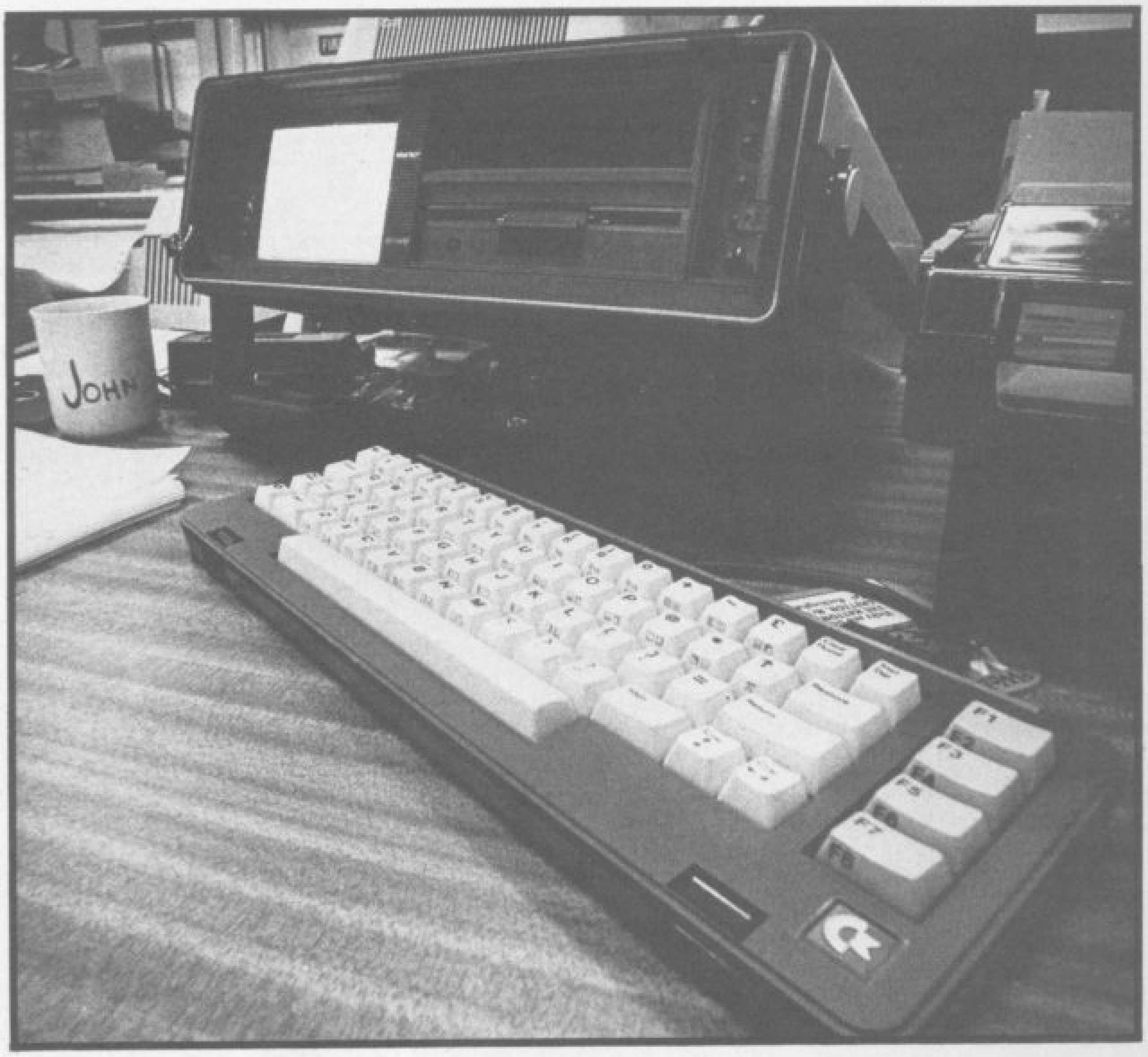
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News



Too much SX makes you blind?

The new Commodore SX-64, you'll all know by now, is the portable and 'executive' version of the homely 64. And (at last) it's on sale here.

It wasn't due to make an official appearance in this country until the Which Computer Show in mid-January. But "due to enormous demand" Commodore flew in about 1,500 machines before Christmas which almost satisfied the 1,800 pre-Christmas orders from dealers.

Now deliveries are winging their way in more regularly, about once a month, and the number of dealers stocking the SX-64 is due to increase after the official launch at the Show.

Commodore professes itself to be "very excited" about the new machine and the alleged enthusiasm with which it's being received bears that out. Still, the £895 price-tag might waterlog that enthusiasm a little. So what do you get for the money?

Primarily, you get a smart 'executive' grey box 14x14x5 ins. The lid comes off to reveal a detachable cable-connected keyboard, restyled from the original – it's still got the same keys, but they look and feel a bit better. Inside the box there's a diminutive 5 in colour screen and a single 1541-style floppy disk drive.

There's a cavernous space above that for a second drive unit or for storing things – like your executive butties?

Commodore reportedly had a lot of problems with the twin-disk machine that was supposed to be available as an alternative to this unit. No word on when (or if) that will appear. The original announcement of a lower-cost monochrome-only version seems to have been quietly forgotten about.

Mathematicians will notice that the same component parts for the original 64 with a monitor and a disk drive work out somewhat cheaper; perhaps because the SX-64 can't be mass-produced in quite the same way. Building a computer robust enough to be portable also ups the manufacturing cost.

So what kind of person will be carrying this machine around? Commodore, true to its highest traditions, is backing *all* the runners. "It will appeal to both businessmen and the home user alike," enthuses its dealer blurb. The home user? But the SX-64 has no cassette interface. Oops!

At £895 the SX is pretty cheap among portables, especially with a real disk drive, a real keyboard and a colour screen. On the other hand, its attraction for 'serious' or 'business' users might be diminished by the lack of a second disk drive; the disks are relatively slow in operation too, and the screen is rather small for prolonged use. Anyway, time will tell ●

Africa Hurrah: *Are there any Commodore-orientated clubs or user groups in South Africa? Subscriber* ***Leon Fourie*** *of New Germany is looking for you...*

Rent-a-game

You've bought a Vic 20, you're eager to buy a lot of games, but you don't know which are good/bad or fun/boring. You'd like to try them out *properly* before you crack open your wallet.

So being able to rent software might sound like a logical idea. Darren Bird certainly thinks it's a good idea, probably because he thought of it. He now helps manage something called the Vic 20 Users Software Library which he set up last February with help from his family (he's just 18 and doing a business course at college).

Now, the Library is renting out a range of cassettes and cartridges for the Vic on a fortnightly basis, charging £1.40 for a tape and £2 for a cartridge – that includes postage and packing. Membership itself costs £10 for two years, so Darren must be confident his business will have some staying power.

"The membership is around 100 now and expanding at the rate of about five per week. It was very slow at the beginning but I'm quite pleased with the way things are picking up."

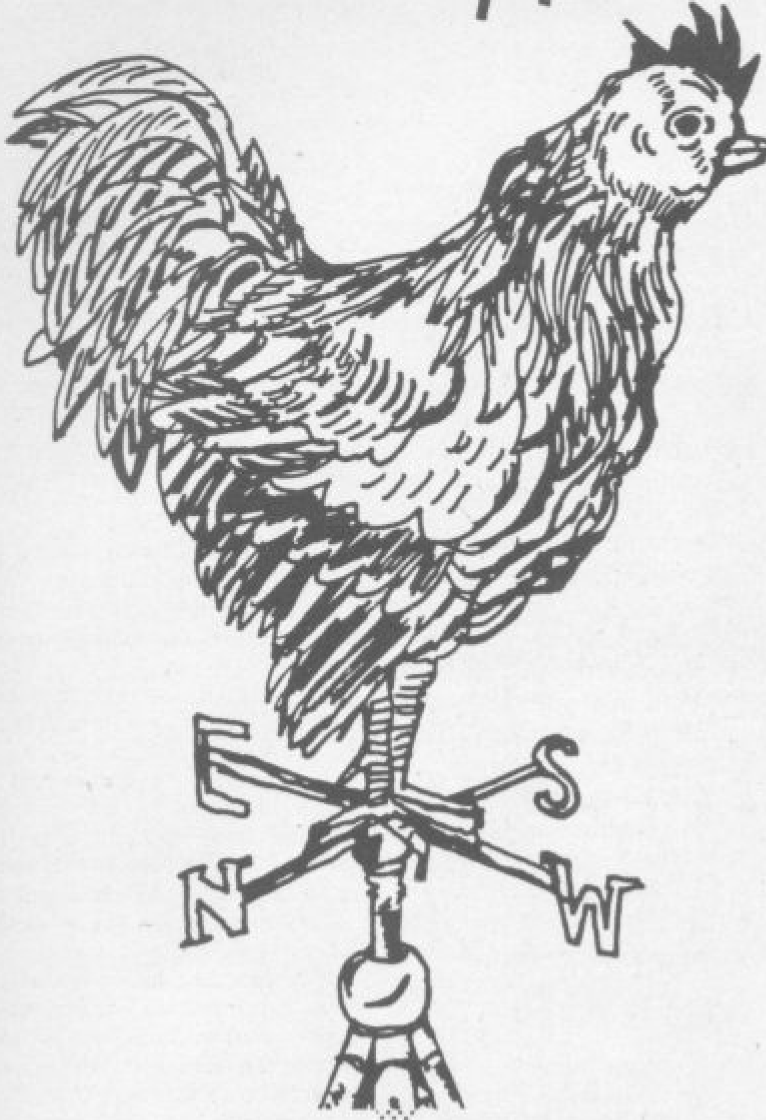
Darren's stocking about 85 titles at present – with five copies of each, it's a large capital investment for a teenager. He says most of the software is games but he's taking note of a survey he sent to members which highlighted a demand for more business, educational and utilities software.

An obvious verbal brick software houses might throw at the Software Library is the charge of copying. "Yes, but I didn't even think of that aspect when we set up the Library. At that time, there was a lot of software available on mail-order and our idea was to let people check it out before buying."

Still, the Library won't stock software without the manufacturer's permission. In practice, this means that its stock is somewhat limited. "We're stocking Romik, Llamasoft, Impact, Shadow and Wessexsoft products; they all gave us written permission. We stock Commodore software too. There's nothing official there but they don't seem to mind." Notable refusals came from the likes of Bug-Byte, Quicksilva and Imagine.

Will the Software Library be carrying products for the Commodore 64? "Not yet, we're confined to the Vic at present because we want to build up both our membership and range." Darren's probably got some exams coming up too.

The Library can be contacted on 0332 83147. ●



Lost in France

Have you seen recent computer-press adverts for the new Cyborg disk drive? You know, the one that supposedly connects to the Vic and Commodore 64? And supposedly gives 720K capacity on a single disk for a bargain-basement £200? Were you filled with joy that there's now an alternative to Commodore's own sluggish offering? And have you sent a cheque to Cyborg?

We hope not. A phone call to Cyborg in Paris confirmed to us theat *no* disk drives for any machines have yet been delivered. In particular, the Commodore versions aren't even ready yet: and according to a Cyborg minion they won't be, until the end of March – at the very earliest. Jean Garutti, Cyborg's boss, was not available for comment.

But what of the many cheques that have already winged their eager way to Cyborg? That same minion told us that people who've ordered the disk drive *will* be informed of the delays. That seems remarkably dilatory to us, especially since the company's been advertising the product for quite some time already.

The company does at least seem to be producing *something*. International Technology Limited in Kent supplied Cyborg with a consignment of disk drives early last year. But ITL's boss, John Melville, told us he didn't want to be connected with the company; and he said he hasn't received any repeat orders.

Diminutive drives

As it happens ITL is manufacturing its own disk drive, the Byte Drive 500, which uses a smaller 3in floppy disk. It's primarily being implemented for the Oric and Spectrum, and should retail at around £193 – the power supply, though, comes as a separate box and will cost an extra £30.

Despite its diminutive size, the 3in disk *is* doubles-sided and is claimed to have a 100KB capacity per side. So far, only a single-density version has been developed; but there are plans for a double-density model, which should mean 200KB per disk.

Before you dash out to the shops, the Byte Drive 500 won't be available for either the Vic or Commodore 64 for some time to come. "We've not fixed a definite date for Commodore machines," confides Melville. "The main problem lies in writing the software." A refreshing piece of honesty?



Pick your own 64 commands

Now here's a fascinating idea: produce a long list of all the commands you'd like to see on the 64 in addition to those Commodore has given you, specify as many of them as will fit into 7,100 bytes, and send off a cheque for £34.95 to receive by return a cartridge containing them.

Sounds good? Well, that's more or less what Whitby Computers has done under the name Softchip-64. Whitby has quite successfully been selling similar EPROMs for the Pet over the last two years now, so it made sense to extend the coverage to ameliorate the "rather paltry" Basic on the 64; the opinion of the 64's Basic comes from David Tindale of Whitby rather than our own good selves, but looking at his list of pick-your-own mix 'n' match commands we're inclined to agree.

Basically you ask for his order form with its list of 106 available additional commands – and Whitby is working on more! Against each command is a note of how many bytes it will take up on the ROM cartridge. That varies from 20 for the IRQ command (restores normal use of interrupts after other Softchip commands have zapped them) and 30 for a CURSOR command that lets you put the cursor on specified x/y co-ordinates ... up to 1,010 for a line renumberer and 1,500 for a full multicolour sprite editor. Most commands seem to fall in the range 150 to 500 bytes, though.

Softchip allows you 7,100 bytes' worth of commands on the cartridge. So you tot up the number of bytes your chosen commands take, add or subtract commands to get near the 7,100, and send the list off to Whitby with your cheque. Neat, huh?

We counted 106 possible commands on the current list, and more are on the way ... which is just as well, since the present list is notably deficient in a couple of areas – like sound and graphics. But Whitby Computers says they're coming, along with some other clever goodies like ready-to-go sound effects and auto-start for your programs. What's more, there's an element of future-proofing in the deal Whitby offers; once you've bought your 7,100-byte cartridge you can have extra commands on tape or disk at the rate of just £1 per 400 bytes – minimum order 2,000 bytes' worth, though, up to a maximum of 16,000.

And what commands are on offer? Well, there are three major groups. One is a collection of programmer's aids that seem to cover nearly all the usual facilities – automatic line numbering and renumbering, find and replace, help, trace, merge ... The only obvious omission is a STEP command. Relatively unusual plus points however are SHRINK (removes all unnecessary spaces and REMs); RESCUE (an UNNEW command); and the helpful LINE and VAR – which tell you respectively how many lines you've got and what variable names you've used.

This collection is actually available as a ready-packaged Softchip under the name Programmer's Friend (makes a change from Fishermen). That cartridge also includes a Pet-style machine-code monitor: and a USER command to define a new command of your very own that's callable from Basic. You have to write your own machine-code for it, of course.

This cartridge also has the second group of Softchip commands, a bunch of disk handling and housekeeping facilities. Some of these, like DCLOSE and SCRATCH, just simplify existing command sequences. Others are brand new – things like RECORD for repositioning the pointer in a relative file: CONCAT to concatenate two sequential files: and COLLECT to free wasted space on the disk.

All good stuff. So is the third group of commands, an impressive series of business-orientated functions that should actually help most people write better programs. Four additional commands, for instance, should largely do away with GOTOs and so enable you to write structured programs (Conditional IF, Else IF, Else, Conditional END).

Also here are "foolproof" INPUT routines with validation for date checking (even picks up leap years!), numbers, and general text entry. There's a kind of ON ERROR GOTO, a couple of 'window' facilities (load and save one screensworth of information at a time), an ON key GOTO/GOSUB, instant screen copy, PUSH and POP for stack manipulations, multiple-line DEF Fn constructions ... manna!

Really fancy extras here include SWAP, which loads in a totally different program but retains your present variables; PCTRL to attack different printers; and SORT, which automatically sorts a one-dimensional array using the fast and efficient Metzner variation of the so-called 'shell' sort algorithm.

A second ready-to-go prepackaging gives you a Business Commands cartridge including those along with the disk handlers.

And there's more. As well as the sprite editor, Softchip have commands to load, save and use sprites. There are several commands for mathematical functions, many of which are similar to those you'd expect to find in a spreadsheet package. And there are numerous handy oddities, like a built-in interface control facility for a Qume letter-quality printer.

All in all it's a fascinating pick-your-own mix-'n'-match approach – choose what commands you want and they'll parcel them up into a cartridge for you. We have the Business Commands and Programmer's Friend cartridges for review and will report ASAP. Meanwhile, Whitby Computers is on 0947 604966.

Golden Tools

SM hasn't made big waves in the UK yet. But it's trying to, with a series of software packages for the Commodore 64.

SM Software is the UK subsidiary of a West German software house of the same name which, according to one of its UK directors, Ken Godden, is "the leading European supplier of Commodore software". It also developed the Commodore 8096's operating system, so it might well know what it's talking about ...

The 64 line is called the Golden Tools series, an adaptation of similar packages SM produced four years ago for Commodore 8096 machines. The five packages are now being tested for the UK market; they've already been translated from the original German and should be available soon.

Three of the five are programming aids. There's **Kit-64**, a debugging program resident in ROM, which gives a number of debugging and test commands: looks very useful. **MAE-64** is a macro assembler for programming in machine code – allows you to construct a machine-code routine, give it a name and build it into your code (having done that, you can list the named routines again).

The third package, **ISM-64**, seems very good indeed on specification. It is an index sequential file manager which comprises a set of commands for file-handling routines in Basic – and that sounds like being pretty useful, since Basic doesn't include obvious commands for setting up and maintaining files.

All three packages will retail at between £40 and £50 apiece on floppy disks.

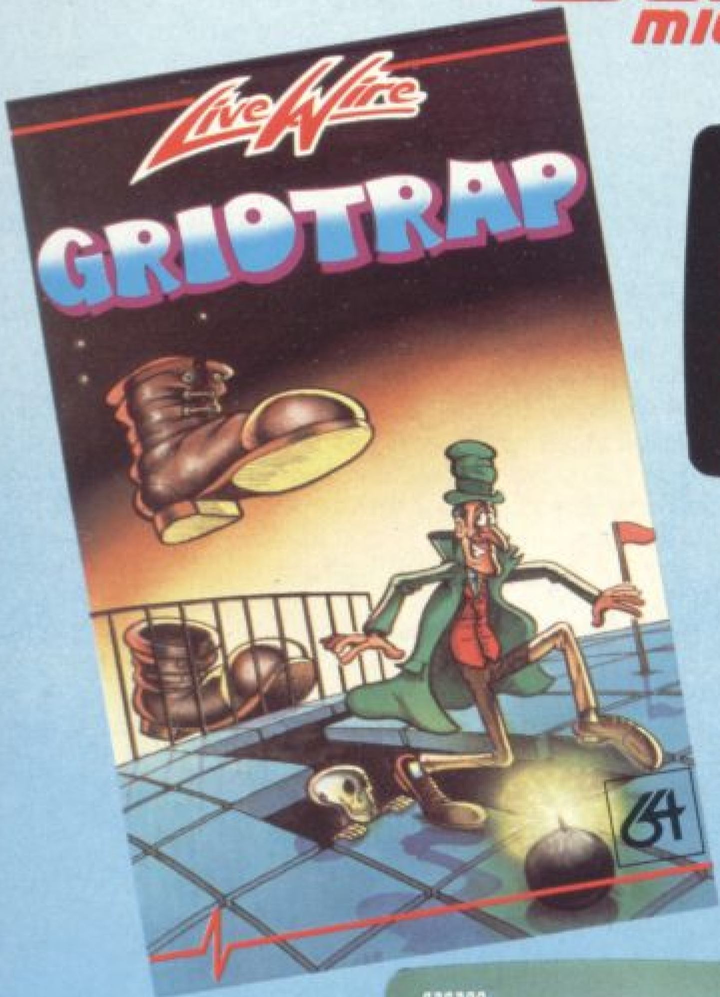
More interesting for the business-orientated user wanting load-and-go software is **Text-64**, a word processing package. Also on floppy disk, it will retail for a very competitive £60. Text-64 apparently makes use of the 64's function keys, scrolls up to 120 columns horizontally and uses the machine's colour facility. We can't say more until we get our review copy ...

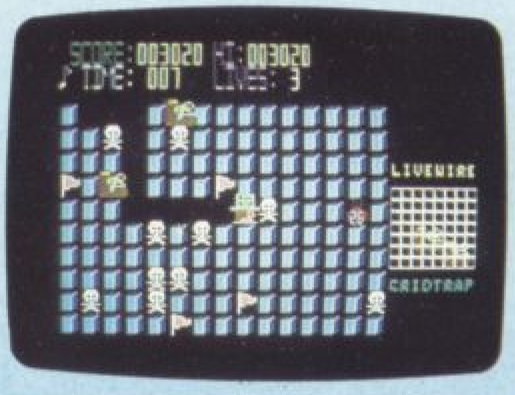
The package is complemented by **Cuda-64**, an address database with which it can fully integrate – "they work together so you can do mail-merge," says Godden. Cuda-64 is being priced at £50.

"We see the 64 as a very adequate small business system," he enthuses. Certainly, SM's prices alone should attract interest, especially since rumours abound that Commodore has recouped its investment costs on the 64 and is likely to make more drastic price cuts.

Monitoring: *At long last Commodore's 14in colour monitor seems to be available. You get much better screen definition than on an ordinary TV and at an RRP of £230 including VAT they don't look to be bad value. Still, you might have expected a model that could be switched between TV and monitor modes at that price ...*

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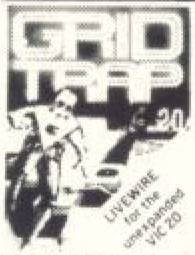
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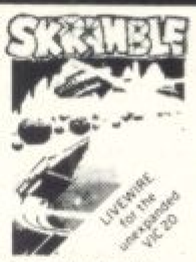
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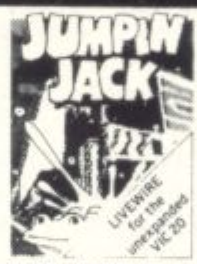
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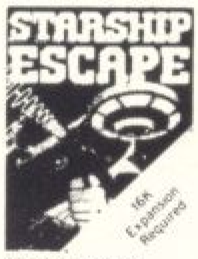
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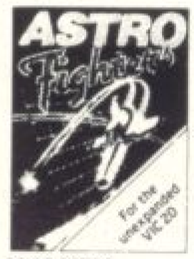
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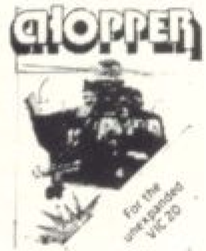
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When all's said and done, however, we do have to admit that in one respect the Commodore 64 isn't up with the competition. It costs around £229, much less than any comparable machine.

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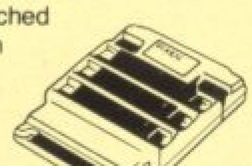
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TOMMY'S TIPS



Dear Tommy, **I have a number of questions about the Vic-20 and I wondered if you'll be able to answer them. One of the reasons why I bought a Vic in the beginning was its expansion possibilities; and yet as I expand my system I am coming across a number of wierd features.**

- **When using a 16K RAM pack and the Super Expander together in a motherboard I was suprised to see that the bottom 3K of the user RAM is used for the hi-res screen (rather than the isolated 3K below the screen). I read a bit about this and I gather that as well as this I can't situate a user-defined character set or relocate the screen in this area. Could you please qualify what I have observed? If it is so, is there any way round it? And why could the screen not have been located at decimal 1024 – so that when more RAM is added there would be none of this reconfiguring nonsense?**
- **Why is the screen/colour RAM held only as four-bit nibbles? Would the Vic not be more flexible if it were in whole bytes, thus providing a 512K area for data or M/C routines?**
- **In graphics commands, why is the screen formed in a 1024x1024 matrix when the screen is only 160x160 pixels? The 1024 format requires 10 bits to hold it; could you tell me how this value is used to decide the chosen location? Is the 1024 format used because of possible future expansion?**
- **I have an Anadex printer with the appropriate RS232 interface. My question: why is handshaking not implemented on the Vic? According to the reference guide the command register is not required; so how do I get my machine to hold off until the printer is ready?**
- **A number of my peripherals use locations in the I/O area, notably a speech synthesiser and a 64K RAM pack with bank switching. With the exception of the VIA and VIC chips which are well documented could I obtain a more detailed memory map of the area?**
- **Why is it not possible to GOTO or GOSUB a *variable*, as in 100 A=200:GOTO A?**
- **My final query relates to a simple M/C routine I have written which 'saves' a Basic program from its usual place and 'loads' it into a higher protected area. It also downloads a saved Basic program to its proper place. This means I can have a number of Basic programs in the machine at one time – or I *could* have if it worked ... but it doesn't.**

It saves and downloads a program all right; and afterwards I can LIST it too. I can also run it ... until it reaches a GET, INPUT or READ statement, whereupon the Vic comes up with an UNDEFINED STATEMENT ERROR. Any attempt to regain the system hangs everything.

Obviously simple copying of Basic bytes is not enough. How can I preserve my GET/INPUT/READ statements? And in connection with this, how do I get access to the NEW command in assembler?

Whew! What an epistle! Well, here goes. The areas occupied by the screen and colour RAM areas in memory are decided by the design of the 6561, the VIC chip which gave the Vic-20 its name. In order to simplify the design of the chip (i.e. to cut costs) there are only a few areas of memory which can be used for screen and colour RAM. Unfortunately, $400-FFF is not one of them. Short of redesigning the 6561 there is not much you can do about it.

The colour RAM is only in nibbles because there are only 16 colours available on the Vic. 16 colours can be expressed in four bits, so only four bits of each byte in the colour RAM are used. The nibbles could have been packed two to a byte to halve the size of the colour RAM area, but that would only save 256 bytes (not 512): and it would make programming and designing 6561s more difficult, because you would lose the one-to-one relationship between a character in the video RAM and a nibble in the colour RAM.

The graphics commands use a 1024x1024 matrix to allow for future expansion, as you suggest. If X contains a value in the 1024x1024 system, the actual location selected in the 160x160 system is given by...

X1 = X*160/1024

Moving on to the RS232 problem, it sounds as if your interface is not really 'appropriate'. The Vic can implement full handshaking so as to transmit data to the printer only when the printer is ready. (As the printer is much slower than the Vic this is obviously necessary: otherwise the Vic will send out data much too fast for the printer to print it.)

Not all RS232 interfaces have full handshaking, though. You may have a simple 'three-interface', where the three lines are Transmitted data, Received data and Ground. This type of interface is only really useful for sending data between two computers, whose speed is higher than the transmission rate (the 'Baud rate') of the RS232 link. Even then it is not much use for serious work.

You can tell if you have a full interface by looking at the number of wires connected to the plugs; if it is more than three or four you have a full interface (there may be two ground leads giving you four wires altogether in a three-line interface).

If you do have the full interface and the printer and interface are both working properly, your most likely problem is that the plug to the printer is not wired correctly for that printer. There are unfortunately several varieties of the RS232 'standard' and different printers use different pins on the connector to signal 'not ready'. A good dealer (or failing that a letter to the interface manufacturer) should sort you out.

Apart from the 6561 VIC chip and the two 6522 VIAs there really isn't much in the I/O area. The only way to obtain technical information on your peripherals is to write to the manufacturers, although they may not be too happy to tell the world how their devices work for fear of piracy.

It is not possible to say GOTO A because the Basic interpreter was not written to allow it. That's the glib answer: the serious response is that what you want to do is generally frowned upon by experts. You have a very powerful **ON X GOTO** facility in Basic; and if that will not cope with your needs, I'm afraid that your program is badly designed or badly written. In fact, many of the structured languages such as Algol or Pascal try to do away with GOTOs altogether on the grounds that the GOTO statement encourages bad programming.

Without more detailed information I can't tell exactly what is going wrong with your routine, but there is nothing very complicated about what you are trying to do. When you 'save' your program you must copy as far as the three consecutive zero bytes which mark the end of the program. When you 'download' the program back into the normal program space, the *second* of these zeros is the end-of-program address to be sorted in locations $2D and $2E. Having done this you have to perform a CLR operation to set up all the other pointers, for which you use JSR $C660. After this you should be able to run your program without any problems. The address of the NEW statement is $C644.

Dear Tommy, **I would like to make games on the Commodore 64 more interesting by making the music more sophisticated. I have tried all the attack, decay, sustain, release and waveform values which are given in the manual; but I have found them incorrect – for example, I do not think that the values supposedly given for the trumpet generate a sound even similar to that of a trumpet. Can you give me more adequate values for the following instruments: piano, flute, harpsichord, xylophone, accordion, trumpet and drums?**

Admittedly the values given in the manual aren't very good. But then the people writing the manual are not musicians and do not have the time (and probably not the ability either) to find the best values for each instrument. On the other hand, the 64 is not a musical instrument; and its ability to mimic real instruments is limited – just as the horn and violin diapason stops on an organ do not sound exactly like the instruments they are named after.

As Tommy is renowned for the complete lack of musical ear (as many a Saturday night at the local has proved) I would not presume to try to make any suggestions myself. How about some musical whizzkid writing in with some information? The flute should not be too difficult as it produces an almost pure sine wave; but a full 93-piece drum might prove a little tricky!

Dear Tommy, **I have a tip to pass on to other readers, and a few queries of my own. First the tip: rather than risk damage to the video lead and TV aerial socket by constantly plugging the lead in and then unplugging it at the end of each operating system, fit an aerial splitter/combiner. All leads then stay permanently**

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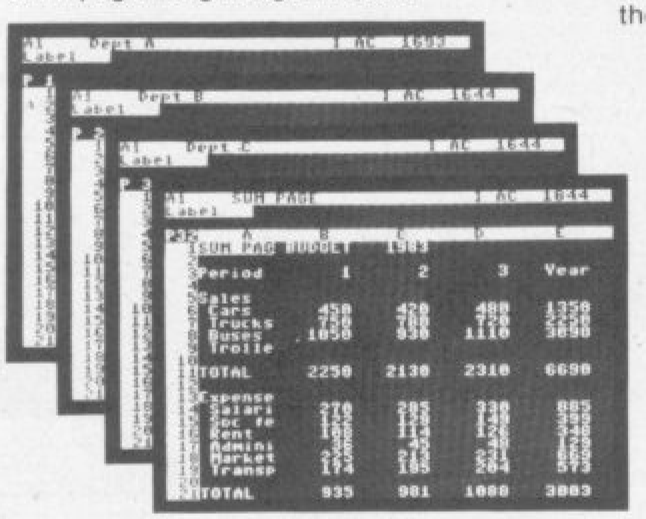
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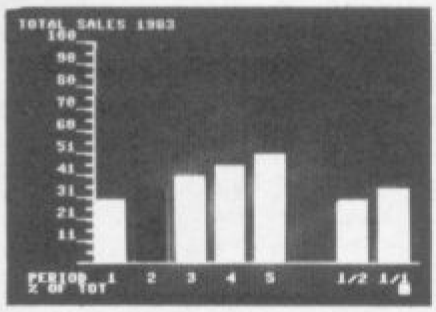
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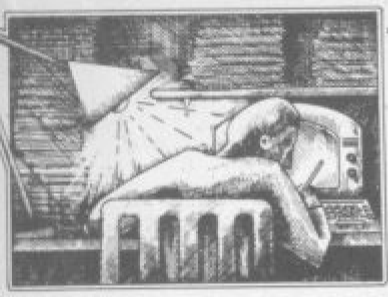
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Tommy

connected. The effect is of having two alternative aerials to the TV – one from the computer and one from the real aerial. (If you have a video recorder, then the splitter/combiner must be connected between the recorder and the TV.) The splitter will only cost a few pounds and can be bought at any TV spares shop. *(Highly recommended – we use one ourselves. And we'll be adding one at a discount price to our Deals for Readers catalogue soon – Ed.)*

Now my queries:

● **When printing from my Simply Write 64 word processor to a 1515 printer, the printer often hangs up midway through text. If the printer itself is turned off and then on, printing resumes but usually with the loss of one line of text. Is this the result of the famous timing problem, and what can be done about it?**

● **I have installed Simon's Basic, and I find it an excellent product which really does all that it promises. But there is one problem, again with the printer. Having written a program, I am quite unable to LIST it to the printer if Simon's Basic is still fitted – the printer simply puts out a few lines containing one graphics character, and then stops. The effect disappears if I shut off the 64, remove the cartridge, power on again, reload the program, and LIST in the normal way. In this mode, all Simon's Basic instructions are tokenised and printed as such, which makes reading the listing rather tiring. Has anyone else hit this problem?**

● **At work I have a 4032 Pet with 4040 disk drive. Any program written to the Pet can be written to a 4040 disk which can be read by my 1541 drive, loaded on to the 64 and normally run without trouble. But I cannot manage to do the reverse – save a 64 program on the 1541, transfer the disk to the 4040 and then load it and execute it on the Pet. I imagine that the program header contains a load address and that the program is being loaded at the point in Pet RAM above the start of normal Basic text. How can I get at it?**

○ The word processor should not simply hang up when printing to the printer. Presumably this does not happen when you drive to the printer from a Basic program, or LIST a program on the printer? If these are alright then the problem probably lies in the Simply Write program, in which case your dealer should change it for you.

Simple Software, purveyors of the WP program, tells us they've had a couple of instances of this: they're baffled, especially since it doesn't seem common – and in at least one case the bug disappeared of its own accord, which suggests a hardware problem like a loose connection.

Simple Software suggested that anyone with this bug should contact them direct on 0273 504879.

○ The LIST bug in Simon's Basic is very irritating. To list a program, *do not* follow the instructions in the manual. Instead type *all* the print commands on one line, for instance **OPEN 4,4: CMD4: LIST**. And to do a second listing, you have to **CLOSE 4**, turn the printer off and on again, and type a new OPEN/CMD/LIST sequence.

○ The Pet Basic program starts at $400, the 64 program starts at $800. So we have a problem. The way round is to move the Basic pointers to $800, although you lose 1K of memory like this. Before you load your 64 program, type in the following instructions on the Pet:

POKE 41,8: POKE 2048,0

You should then be able to load the program without any problem.

Dear Tommy, I have mastered the technique of using POKE 36869,254 to send the machine to byte 6144. Now, recently I typed in a game program which needed 3K expansion: as I only had a 16K RAM pack, I tried to convert it for my use. I altered the memory address and also used 206 instead of 254 for calling the user-defined graphics; but the program never seemed to work.

I kept on getting OUT OF DATA errors; and when I listed the program, the lines were all changed to rubbish.

In the program there is a machine-code routine to make the screen scroll from right to left. This sits in the cassette buffer and is called up by SYS 829. Do you think this has got anything to do with it not working?

Last, when I use the Programmer's Aid with the 16K RAM I found that the function key does not function – when I typed in KEY I found that all the function commands changed into the graphic forms. So I re-functioned all the Key commands; but after a few minutes they just changed back again. Is there something wrong with my 16K RAM? Or is this supposed to happen when the Vic is expanded?

It can be very difficult converting programs which use a 3K expansion to run on a Vic with a larger expansion. The reason is that a 3K expansion fits into the memory from locations 1024 to 4095, whereas an 8K or larger expansion fills memory from 8192 upwards. Also, when you add a 3K expansion, the start of screen memory moves to 1024 – which is where your Basic program is located with the 16K expansion!

The result is that the screen-scrolling program is scrolling your Basic program! The best way round the problem is to rewrite the machine-code to use the screen memory at 4096-4607, which is where it moves to with the 16K expansion.

Alternatively, if your expansion is a 16+3K expansion, there is some memory at 1024-4095. Then you can fool your expanded VIC into thinking that it is a +3K Vic by a few POKEs before you load your program:

POKE 642,4: POKE 644,30: POKE 648,30: SYS64824

If you have fitted a 16K expansion, then Basic overwrites the memory area used to store the function key definitions! Sorry!

Dear Tommy, I have been working on a Sine Wave program for the Vic-20. All I have done so far is to plot the sine wave using the Super Expander cartridge. Could you show me how to make the wave keep moving across the screen?

Before we get carried away with this program, you must not expect anything too spectacular from Basic. It is simply too slow to provide a convincing moving wave. I assume that you are using a routine like this to plot the wave:

```
100 FOR X = 1 TO 1023
200 Y = 500 + 200*SIN (X/50)
300 POINT 1,X,Y
400 NEXT
```

What we have to do is then redraw the sine wave displaced slightly.

```
100 FOR  T = 1 TO 10
200 FOR X = 1 TO 1023
300 Y = 500 + 200*SIN (X/50)
400 POINT  0,X+T−1,Y:  REM
    ERASE  POINT  ON  LAST
    WAVE
500 POINT 1,X+T,Y: REM PLOT
    NEW POINT
600 NEXT: NEXT
```

Be warned though: this is very slow!

Dear Tommy, Where is the machine-code routine that prints a number in the FAC located? Also, where is the routine that converts a base 10 number to a floating point number? And what are the parameters?

What machine are you talking about? I hope you mean the Vic because that's all you're going to get! The routine which prints the FAC is at $DDD7, but you must load the Y register with 1 before calling it:

LDY #1
JSR $DDD7

What do you mean by a 'base-10' number? The base of a number, be it 2, 8, 10 or 16, is just the way we humans write the number down. The *actual* value is independent of the *base*; so 11000 in binary is the same as 22 in octal, 18 in decimal and 12 in hexadecimal.

There are two routines which convert numbers into floating point. $D7B5 converts an ASCII string to floating point (the equivalent of the Basic VAL function). The address of the string should be stored in $22 and $23 (in the normal low-high format) and the length of the string is held in the 6502 accumulator. The routine at $DC49 converts an unsigned integer (0 to 65535) in $62 (LSB) and $63 (MSB) into the floating point. In both cases the result is held in the FAC.

Dear Tommy, I have hooked up an IBM typewriter to the user port of my Vic. By means of an assembly program which is POKEd into the top of memory and protected by changing the end of the Basic pointers, I can now send the converted bytes to the user port.

For printing out files this works fine. The problem is that when I want to make a listing of a program I can find no other way than to LIST a small section to the screen and then copy it to the IBM. Is there some fancier way to get a listing?

Locations $326 and $327 hold a pointer to the output routine, and the pointer normally sends characters on the screen. All you have to do is modify these two to point to your assembler routine; and anything which would have gone to the IBM. You can now type LIST and away it will go! Make sure that your routine clears the carry flag before it returns though.

People

The Commodore User Profile

The soft side of Commodore?

Gail Wellington: up at the sharp end

"If it's software it's mine", she'll tell you: but then she does have a capacity for the abrupt one-liner. Gail Wellington is American. She used to write fiction, she exudes an air of purpose and authority, and she's Software Products Manager for Commodore UK. That means she is now in charge of a key department for the company – one that not only produces software for the Vic 20 and Commodore 64 but also acquires and assesses software products for future development.



Her operation is now completing its first year in the software business, an area she admits Commodore entered rather casually. Now, she doesn't hesitate to assert its importance: "Instead of being second class, we're now a viable factor in the corporate business" – Commodore UK *is* making a stronger commitment towards software, carrying out a dictum recently made at the highest corporate levels. We sent Bohdan Buciak up to Commodore Towers in Slough to find out how Gail Wellington runs her domain.

Gail Wellington came to Commodore through a mixture of skills which, at first glance, looks incompatible; she's got a US degree in mechanical engineering and she's also acquired writing skills along the way. "I used to be a freelance journalist; I've written fiction and I've contributed to both women's and computer magazines."

But her writing career was brief; she was soon told to devote her skills to editing rather than doing the pen pushing herself. That didn't last long either. When the software products manager's position became vacant Gail Wellington got the job.

Today she extends her influence (she likes to think she does it in a motherly way) over 14 people and has split her department into four main areas.

Floppy copies

The first thing that strikes you on entering Gail Wellington's domain is the crowd of Commodore Pets with dual 4040 disk drives perched rather incongruously on top of their screens. Old-style Pets? Old-style disks? But these machines have nothing to do with actual software development, they're just used to make endless copies of the stuff.

At present, there's a production run on the Easy Script word processing package for the 64. Next week it could be Easy Stock or High Flyer, the Commodore 64's business simulation game. And we're talking big numbers – there are 20 machines producing 16,000 disks per week, all day, six days a week. You'd expect a hi-tech organisation like Commodore to have a sophisticated disk copying machine; but according to Gail Wellington, the Pets do the job just as well, or so it would seem: "there's no capital investment because the equipment belongs to us. The Pets are also practical for the volumes we produce."

But the real activity in Gail Wellington's department starts with the support technicians – three of them at present. They're all programmers but they don't actually originate software themselves; "They advise people who are writing software for Commodore; they write the protection programs and utilities, they make reports and develop information on new products.

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They also do a lot of talking to software houses.

"It takes a special type of person to do this job. Apart from the programming requirement, it involves a fair amount of interface with the outside world: and it requires the ability to write. We give everybody a writing test before they start; knowing how to communicate is an important part of the job."

Home-grown software?

Looks as though she's got software development sewn up. But what about the coding side? How much original programming is done in-house?

Not a lot, it seems. "We write very little ourselves. Sometimes we have our own ideas developed by somebody outside who we've commissioned because we know he already specialises in that field." Andrew Spencer, for instance, was approached by Gail Wellington to write the 64's *Soccer* cartridge game – one of the best games we've seen in terms of its use of the 64's capabilities.

"We also get a lot of ideas sent in to us. *Gortek and the Microchips*, for instance, appeared in the postbag one day with a letter asking for advice on publishing the idea; we snapped it up." *Gortek* is a clever space-age story that teaches youngsters the basics of programming: we'll be reviewing it soon.

Commodore receives a great deal of material from hopeful programmers, around 100 programs per month. She insists that every program is given a fair and formal assessment – 'formal' because evaluators use a structured assessment sheet which is completed and returned to eagerly awaiting programmers whether they're spotty kids or hardened professionals. "Obviously we can't do much if a tape won't load or the programmer doesn't supply adequate instructions ..."

Why make such an effort to accomodate a lot of hopefuls? The cynical answer might be that a really good game or program occassionally makes an appearance, so it may be an investment in future Commodore software. Gail Wellington would lean more towards notions like 'providing a service', 'going out to the public', 'keeping abreast of what's going on' and perhaps trying to overcome the sense of impersonality that usually emanates from an international corporation. She seems to be reflecting these notions in the type of people she employs.

Masses and classes

But does her consideration and thought for staff percolate down to the customer; to you, the readers out there? That's probably not a fair question because part of her business – the major part – is to make money for Commodore, and there are good and bad ways of doing that. "Our goal is to produce the best value for money software around. It must be high quality but at an affordable price – 'for the masses, not the classes'." Ah, those one-liners.

With games software constantly changing, it must be difficult to pinpoint what the customer wants at any particular time. "You've got to recognise the fashions of the time. We're trying to do that; we're now looking at strategy and decision-making games rather than zapping. So you'll be seeing new games based on thinking and strategy rather than reflexes."

But that's the games market; Gail Wellington confesses to being more interested in education and what she lumps together as 'the home market', which has now become general Commodore policy. "We're trying to realise the potential in these markets. The *B J Bear* range of software, for example, will be available early next year (on the Commodore 64). It's aimed at early primary school children, helping them with reading, counting and thinking. It'll be one of the implementations of our new speech synthesiser; the program talks to you in digitised human voice speech." Ah-ha, at last it's coming! More about that later. "But I'm more attracted to things that are commercially viable."

Commercial viability

That brings us to the eagerly awaited speech synthesiser. A new game, *Wizard of Wor*, based on the arcade version, will soon be available. It's going to be the first to use the speech synthesiser to approximate more closely to the arcade effect (it *does* work without it too). The speech module, reputed to have only a 250 word vocabulary at present, should be available early this year "at under £50".

Tapes, cartridges, floppies

This year's games cartridges should be more spectacular too: "these days, a game on cartridge has got to have the highest standards of graphics, playability and originality." *Soccer*, for instance, already fits these categories. "We have to feel a cartridge will sell 100,000 copies before going ahead with production. For tape, the graphics still need to be good but we'd only expect to sell about 10,000."

Then there's floppy disk software. "We're not producing disk based software on the Vic for recreational purposes."





Understandable enough since a disk drive costs about three times as much as the basic Vic. "But disk based games are getting to be more feasible on the 64, and we're responsive to the demand. For example, we produced the Introduction to Basic on disk for the 64 because people asked us to."

"There's no technical reason why we can't do all games on disk and we probably will on the 64. In the States, about half our 64s are sold with disk drives. But here we have a product shortage." Now there's an admission.

Peripheral interests

To promote software on disk, there's got to be some connection with the people involved with peripherals. Some joint work is already being done with the speech module; will there be any more such ventures? "We're bringing out a low-cost lightpen early next year and that will have software produced for it. We're also working on a digitising pad. You'll be able to draw on the pad and see your work reproduced on the screen. With an overlay, you'll be able to use it as an input device."

That no longer sounds novel: similar devices like Grafpad from British Micro have already arrived. And the lightpen? Numerous models for Commodore machines are already available (we've got three ourselves to review).



Commodore may have been late there; but tardiness in its software activity could be more detrimental, granted that competition in the software industry continues to be 'lively' with games appearing and disappearing like mayflies? Gail Wellington for the defence: "We're always expanding our range of titles. Few things get to be classics. But they can last from six months to a year depending on their originality, so there's constant activity.

"In terms of competition, we have the advantage of good distribution and we can link hardware and software into an attractive package."

A major plus for Gail Wellington (and for her confidence) is the fact that she likes the machines she's working with. The Vic's great selling points? "It's big, it's got a lot of software and it's got a moving keyboard". All right, it *is* just a little bigger than some home computers. And the Commodore 64, "is a helluva lot of computer for the money".

Lots of languages

It may soon prove to be a greater investment as a clutch of programming languages will be implemented during 1984 – including professional programmer stuff like Cobal and UCSD Pascal (now reaching the test stage at Commodore). Commodore has already demonstrated the 64 running CP/M based software. Lots of demos and lots of claims: no product yet. But a cartridge-based Z80 processor card that allows access to CP/M, the most popular disk operating system for micros, should finally be available by early 1984.

The cartridge together with the CP/M system will cost £50, and that will open up a huge range of business software ... though you won't be able to link 'native' 64 programs and files to anything running under CP/M, and you will have to hope that your preferred CP/M programs come on a 64 compatible disk.

Likewise, only the 64 will get Commodore's very promising Magic Desk. This series of programs was developed in the States where it has been at computer shows: but "we've not established a release date for the UK", says Gail Wellington rather cautiously. Magic Desk is a little bit special because it uses icons or symbols a little like Apple's new Lisa computer. For example, by pointing to a filing cabinet (the pointer 'ooks like a hand) you select the filing function.

Playing the hostess

Still, 1984 looks like being interesting for Commodore software. Gail Wellington is pleased that she's soon to be playing hostess in a formal gathering of her worldwide Commodore counterparts, about 40 people.

"It's going to be the first of regular quarterly meetings with people who do jobs similar to mine. I'm proud that the first meeting's here in the UK; it's indicative of our standing." What she's really saying is that far from being a corporate afterthought, her department is now making itself felt as an important part of the company.

But her saying this comes as no real surprise. Her ultimate boss, Commodore International's heavyweight chief executive, Jack Tramiel, was recently taking the same line when he talked to the American press. "We believe that software is going to be a very important part of our company," he asserted at considerable length. So Gail Wellington is carrying out policy formed at the highest level: it's almost fortunate that the policy happens to fit her personal preferences.

The logical conclusions for such a policy? Tramiel's pronouncement is to the point: "I believe computers are very similar to razors and razor blades. The most important thing is that every home or office should use a Commodore razor. Then we should deliver blades to them and make money on the blades."

Gail Wellington has the job of making sure the Commodore blades are sharp enough.

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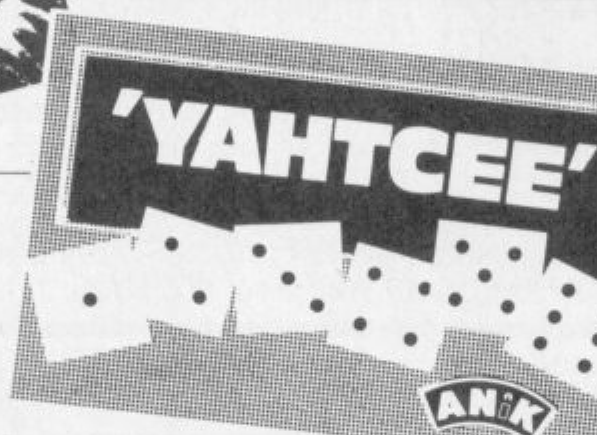
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This here's Prospector Jake, I sure am havin' one helluva time tryin' to peg ma claim with those damned Injuns a hootin' and a hollerin' all over this territory. Ma job gets harder as I move from one Gold Field to another. I know, that is me an' ma stubborn hornery ol' Mule here know of 24 rich an' I mean rich seams of pure Gold. All it needs to make this here ol' critter happy is that you help me peg every doggone last one of them claims.
Can YOU help Jake become rich, help him peg his claim, dodge the arrows, avoid the tomahawks, and plant the Dynamite in just the right place? . . . YOU CAN!!!

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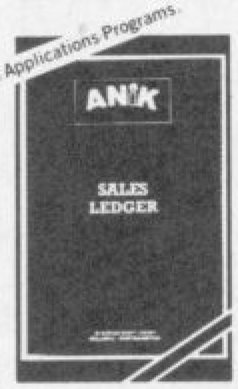
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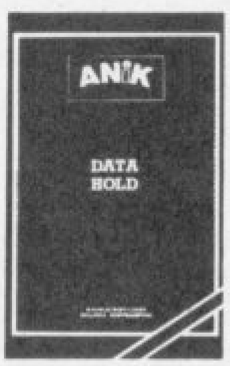
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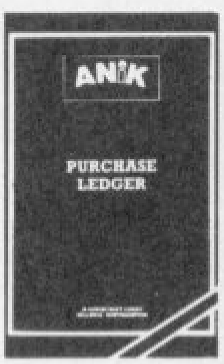
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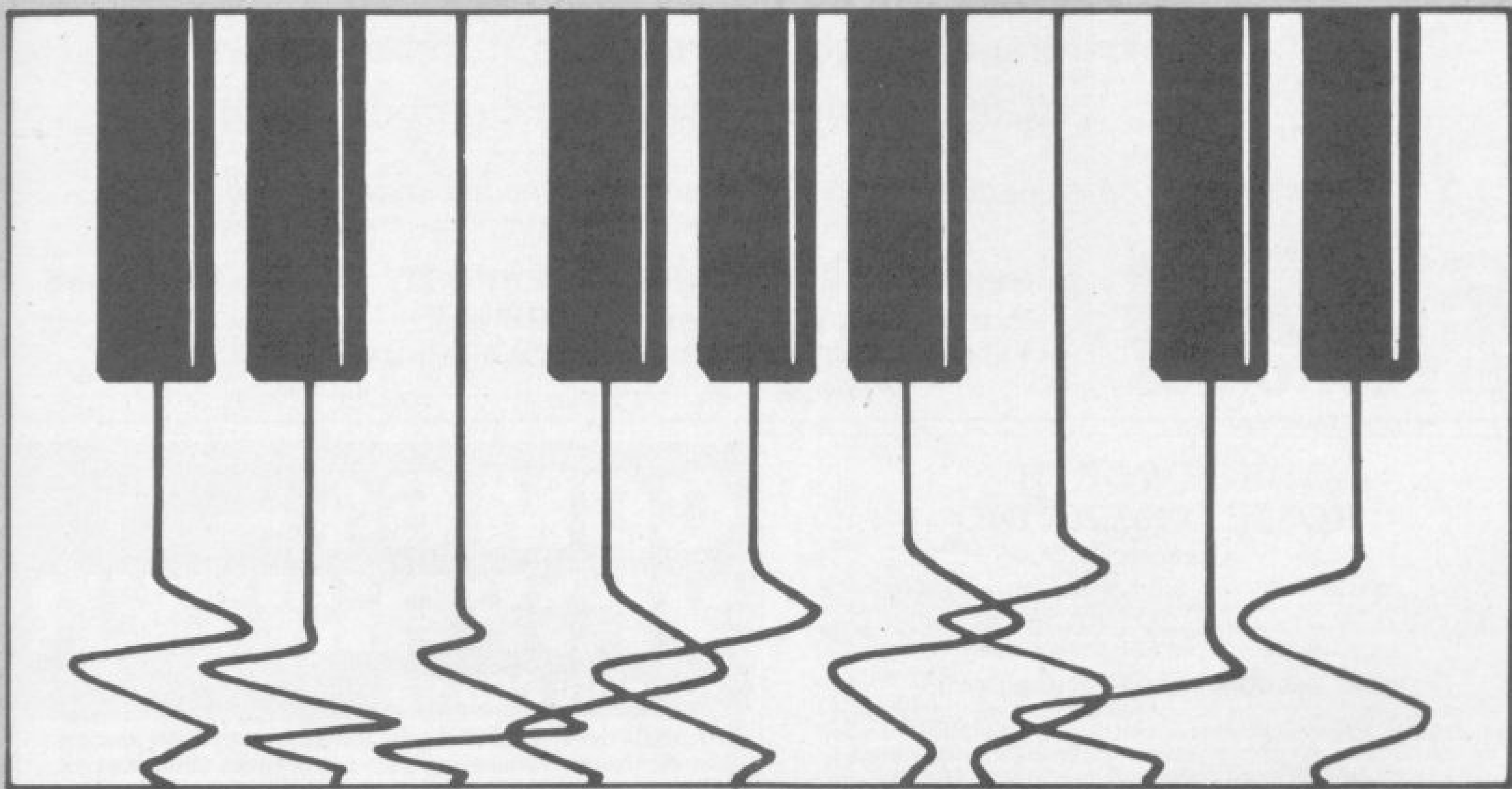
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More complex sound on the Vic

by Jonathon Reynolds



The PEEK and POKE method of accessing sound on the Vic is fine. But at times it can be quite annoying to stop what you were doing, poke values out to the VIC chip, and then resume. Wouldn't it be nice if you could give the Vic a command which allows you to play music and sound without interrupting your program? Jonathon Reynolds has the answer ...

I was inspired one day while playing a game on a BBC Micro belonging to a friend. I was happily pounding away at the keyboard – while the machine played a tune in the background. "How do you make it do that?" I inquired. "Using the SOUND command" replied my friend. "The machine stores several notes in a special buffer, then executes them."

I decided that it would be worth the effort to try and produce a similar effect on the Vic. The objectives I set myself were as follows:

- the Vic must continue doing any job it was doing before, during, and after executing the sound command.
- you should be able to set up a 'tune buffer', so a jingle or song could be played.
- each voice must be programmable
- the volume must be programmable
- the duration of the note must be programmable

Looking at the first point I realized that machine code would be needed. (Beginners, I'll try to keep the descriptions simple). Therefore an IRQ interrupt routine would be needed.

Explanation:

Every 1/60th of a second the Vic stops whatever it's doing with your program to do its own 'housekeeping': when it has finished it returns to your program. It is possible to trick the Vic into executing a piece of your own machine code during this interrupt. The Vic doesn't know any different, so it treats your machine-code routine as if it is part of its usual housekeeping chores.

The latter four of my requirements meant the use of a word table, or in simpler terms the need to reserve an area of memory for the storage of values. I then had to break this table into smaller blocks, each block being six bytes long. Each byte (or each memory location) holds a certain value: when the Vic reads a certain block in the table each byte has a different meaning.

I defined the block as follows:

Byte in block:	Function of value in this byte:
1	the duration of the note.
2	sound value for voice 1 (low)
3	sound value for voice 2 (medium)
4	sound value for voice 3 (high)
5	sound value for voice 4 (noise)
6	the volume at which this note is to be played.

I decided to let the program reside from memory address 7264 (&1C60) onwards; the parameter table was to start at 7424 (&1D00) and go to 7676 – enough room for 42 notes.

Rather than endeavour to give an in-depth explanation of the program I recommend that experienced machine-code programmers take a look at the disassembled version.

Basically the program fools the Vic into thinking that it has to read blocks from the table during an interrupt and act on the information found there. The Vic will continue to look at the table until it finds a duration byte equal to zero or plays all 42 notes.

Note to Editor: Give dissassembled version of machine code. Use the Commodore MCM or similar.

Open 4,4: CMD 4: SYS(start address of monitor) · D 1c60,1cfb+(ret)

Using the programs:

Now carefully type in the MINI ENVELOPE program. Take great care when you come to typing in DATA statements, it is very easy to make a mistake! Once it is typed in SAVE it to tape – just in case when you run it the Vic decides to crash.

Summary of MINI ENVELOPE

Start with a SYS 7264

Parameter table 7424 to 7676 (divided into blocks of six bytes):

Byte:	*Function:*
1	length of note (must be either 0 or between 2 and 255
2	voice 1
3	voice 2
4	voice 3
5	voice 4 (white noise)
6	volume

The Vic will finish after playing all 42 notes or upon finding a zero for the length parameter.

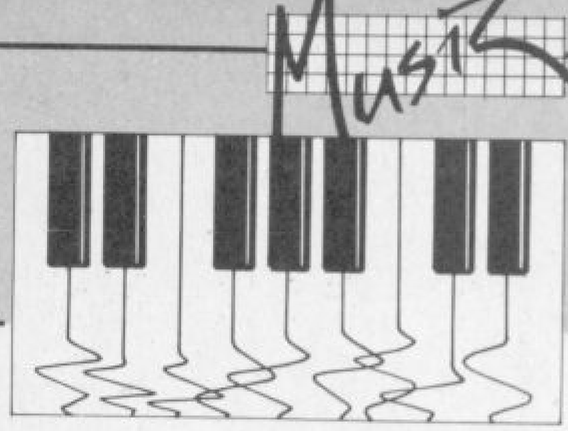
Once you have typed in the program you still have to write music for it. Bad memories of early attempts at user-defined characters immediately come back to mind: scraps of paper everywhere, important pieces of paper mislaid or thrown out or eaten by the dog. But never fear: there is a program to go along with MINI ENVELOPE which should lessen the strain.

ENVELOPE PLANNER allows you to experiment with the MINI ENVELOPE routine. Just type it in and load it after you run MINI ENVELOPE, and you're in business!

How to use the envelope planner:

When run the screen will display a column of words with values beside each word. Below this there is a constant menu displaying all the options available:

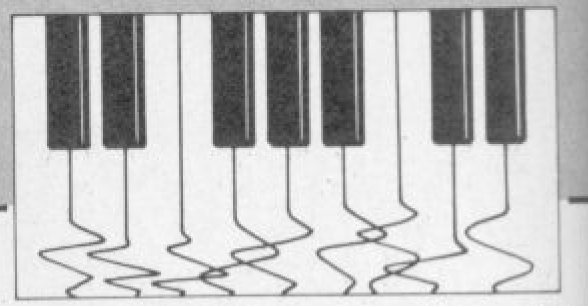
Key	Function	Purpose
+	+ VAL	increase a value
–	– VAL	decrease a value
F5	UP	move cursor up
F7	DOWN	move cursor down
P	PUT	put values into parameter table
G	GET	get values from parameter table
R	RUN	execute music in parameter tape
S	SAVE	save parameter table to tape
L	LOAD	load a previously saved parameter table
C	CLR	clear the working memory of all values – this command does not affect any values in the parameter table.



```
*** MINI ENVELOPE ***

10 POKE55,95
11 POKE56,28
12 CLR
13 DATA7264:REM $1C60
14 DATAA2,00,86,FF,78
15 DATAA2,71,8E,14,03
16 DATAA2,1C,8E,15,03
17 DATA58,60,A6,FF,E0
18 DATA02,F0,13,BD,00
19 DATA1D,C9,00,F0,0C
20 DATAC9,01,D0,17,A9
21 DATA02,9D,00,1D,4C
22 DATA71,1C,78,A2,BF
23 DATA8E,14,03,A2,EA
24 DATA8E,15,03,58,4C
25 DATABF,EA,A6,FF,BD
26 DATA00,1D,85,FE,E8
27 DATABD,00,1D,8D,0A
28 DATA90,E8,BD,00,1D
29 DATA8D,0B,90,E8,BD
30 DATA00,1D,8D,0C,90
31 DATAE8,BD,00,1D,8D
32 DATA0D,90,E8,BD,00
33 DATA1D,8D,0E,90,E8
34 DATA86,FF,78,A2,D2
35 DATA8E,14,03,A2,1C
36 DATA8E,15,03,58,A6
37 DATAFE,CA,E0,00,F0
38 DATA05,86,FE,4C,BF
39 DATAEA,8E,0A,90,8E
40 DATA0B,90,8E,0C,90
41 DATA8E,0D,90,8E,0E
42 DATA90,78,A2,71,8E
43 DATA14,03,A2,1C,8E
44 DATA15,03,58,4C,BF
45 DATAEA,**,**,**,**
46 PRINT"[CLR][CUDX8]"TAB(3)"MINI ENVELOPE V3"
47 PRINTTAB(5)"[CUD][CUD]COPYRIGHT BY"
48 PRINT"  JONATHON  REYNOLDS"
49 PRINTTAB(5)"[CUD](APRIL 1983)"
50 READL
51 READA$
52 C=LEN(A$)
53 IFA$="**"THEN63
54 IFC<1ORC>2THEN62
55 A=ASC(A$)-48
56 B=ASC(RIGHT$(A$,1))-48
57 N=B+7*(B>9)-(C=2)*(16*(A+7*(A>9)))
58 IFN<0ORN>255THEN62
59 POKEL,N
60 L=L+1
61 GOTO51
62 PRINTL"'"A$"' ???":END
63 PRINT"[CLR]** MINI ENVELOPE V3 **"
64 PRINTTAB(3)"PARAMETER TABLE:"
65 PRINTTAB(5)"7424 TO 7676"
66 PRINT
67 PRINTTAB(4)"EACH PARAMETER"
68PRINTTAB(6)"SIX BYTES:[CUD]"
69 PRINTTAB(5)"£1     LENGTH"
70 PRINTTAB(5)"£2     VOICE1"
71 PRINTTAB(5)"£3     VOICE2"
72 PRINTTAB(5)"£4     VOICE3"
73 PRINTTAB(5)"£5     VOICE4"
74 PRINTTAB(5)"£6     VOLUME"
75 PRINTTAB(6)"[CUD]START WITH"
76 PRINTTAB(7)"SYS 7264"
77 PRINTTAB(3)"[CUD]STOP WITH A ZERO"
78 PRINT" FOR LENGTH PARAMETER":POKE198,0
```

Music



You will notice on the left hand side of the column of words that there is a big arrow. This is your 'cursor'; by hitting the F5 and F7 keys you can move this cursor up and down beside the words shown.

Once you have positioned the cursor beside the word you want, you may change the value assigned to it by using the '+' or '—' keys to increase or decrease the values.

When you have finished defining one note you take your cursor up to the word 'NOTE' and hit the '+' key. You can now define your next note; and so on, up to 42 notes. To tell the Vic that you have finished your tune, make the length of the note after your last note equal to zero: otherwise the Vic will automatically stop after 42 notes or until it comes across a zero for the length parameter.

When you have finished defining your tune you must place it into the parameter table using the PUT command. Hit 'P' to do so. Now it is possible to run your tune by using the RUN command: hit 'R'.

You may wish to clear what is in the working memory by using the CLR command. Just hit 'C'. This will reset all values to zero, but will not affect any values already in the parameter table.

If you decide that you want to save the tune in the parameter table for later use the SAVE command by hitting 'S'. Later you may like to recall the previously stored data. use the LOAD command by hitting 'L'. But before you can start to modify the data you will have to recall it back into the working memory with the GET command – hit 'G'.

The shortest *duration* for a note is 2/60ths of a second (the program automatically converts durations of 1 to this value to avoid system crashes). The longest possible duration is 255/60ths of a second.

The *volume* must be set with values greater than zero or you will not hear anything. The *voices* may be set with values between 128 and 255 for audible sound: refer to pages 135 and 138 and the chapter on music in the *Friendly Computer Guide* for what kind of sounds you can actually produce.

The obvious application for this program is in games. Now you can shoot your aliens and have your music too – in three-part harmony? More ambitious programmers may like to convert the program to allow more than 42 notes or convert the machine code so it will run with 8 or 16K in place. (Just change the branch addresses in the machine code.) Anyway, happy experimenting...

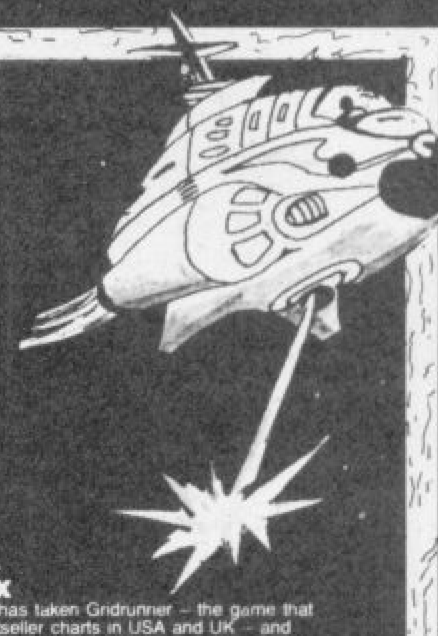
*** ENVELOPE PLANNER ***

```
10 CLR:DIMP(6,42):N=1:POKE650,128:POKE36879,8
20 PRINT"[CLR][WHT]    [RVS]ENVELOPE PLANNER[RVO]    "
30 PRINTTAB(6)"NOTE NO.":PRINTTAB(6)"LENGTH":PRINTTAB(6)"VOICE1":PRINTTAB(6)"VOICE2"
70 PRINTTAB(6)"VOICE3":PRINTTAB(6)"VOICE4":PRINTTAB(6)"VOLUME":GOSUB9000
100 PRINT"[HOM][CUDX2]";
110 PRINTTAB(12)"    [CULX4]"N
120 FORI=1TO6:PRINTTAB(12)"    [CULX4]"P(I,N):NEXT
200 PRINT"[HOM]":FORI=0TOP:PRINT:NEXT
210 PRINT"[CUP] --->":I=PEEK(197):IFI=55ORI=63THEN3000
221 IFI=34THENRUN
222 IFI=13THEN6000
223 IFI=19THEN6100
224 IFI=10THEN6200
225 IFI=21THEN6300
226 IFI=41THEN6400
230 IFI=64THEN200
240 IFP=0THEN1000
250 GOTO2000
1000 IFI=5THENN=N+1:IFN>42THENN=1
1020 IFI=61THENN=N-1:IFN<1THENN=42
1030 GOTO100
2000 IFI=5THENP(P,N)=P(P,N)+1:IFP(P,N)>255THENP(P,N)=0
2020 IFI=61THENP(P,N)=P(P,)-1:IFP(P,N)<0THENP(P,N)=255
2030 GOTO100
3000 PRINT"[HOM]":FORX=0TOP:PRINT:NEXT:PRINT"[CUP]      "
3030 IFI=55THENP=P-1:IFP<0THENP=0
3040 IFI=63THENP=P+1:IFP>6THENP=6
3050 GOTO200
6000 GOSUB8500:PRINTTAB(7)"[RVS] P [RVO] WAIT":FORJ=1TO42:FORI=1TO6
6020 POKE(7424+((J-1)*6)+I-1),P(I,J):NEXTI,J:GOTO8000
6100 GOSUB8500:PRINTTAB(7)"[RVS] G [RVO] WAIT":FORJ=1TO42:FORI=1TO6
6110 P(I,J)=PEEK(7424+((J-1)*6)+I-1)
6120 NEXTI,J:GOTO8000
6200 IFPEEK(7264)<>162THENGOSUB8500:PRINTTAB(4)"[RVS]PROGRAM  ERROR[RVO]":GOTO6230
6210 GOSUB8500:PRINTTAB(7)"[RVS]RUNNING.[RVO]"
6220 SYS7264
6230 FORI=1TO500:NEXT:GOTO8000
6300 GOSUB8500:PRINTTAB(5)"[RVS]PLAY ON TAPE[RVO]"
6301 IFPEEK(37137)<>62THEN6301
6302 GOSUB8500:PRINTTAB(5)"[RVS]LOADING DATA[RVO]"
6310 LOAD"",1,1:CLR:RUN
6400 GOSUB8500:PRINTTAB(6)"[RVS]PLAY & REC[RVO]"
6401 IFPEEK(37137)<>62THEN6401
6402 GOSUB8500:PRINTTAB(5)"[RVS]SAVING  DATA[RVO]"
6410 POKE172,0:POKE173,29:POKE174,255:POKE175,29:POKE193,0:POKE194,29:POKE186,1
6420 POKE183,0 :POKE820,0
6430 POKE187,52:POKE183,3:POKE185,1:SYS63109:GOSUB8000
8000 PRINT"[HOM][CUDX11]                          ":GOTO100
8500 PRINT"[HOM][CUDX11]";:RETURN
9000 PRINT"[CUD][CUDX3] [RVS] + [RVO] +VAL   [RVS] P [RVO] PUT[CUD]"
9020 PRINT" [RVS] - [RVO] -VAL   [RVS] G [RVO] GET [CUD]"
9030 PRINT" [RVS]F 5[RVO] UP     [RVS] R [RVO] RUN[CUD]"
9040 PRINT" [RVS]F 7[RVO] DOWN   [RVS] C [RVO] CLR[CUD]"
9050 PRINT" [RVS] S [RVO] SAVE   [RVS] L [RVO] LOAD[CUP]":RETURN
```



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Save the interstar freezer, Snowball 9, in a huge space adventure with over 7000 locations.

Note: a lot of players take much longer than the times above. Don't be discouraged if you are one of them!



Snowball was too new to have been reviewed when this ad. was placed, but here is a sample from the superb independent reviews of our first three adventures:

"The Level 9 Adventures are superbly designed and programmed, the contents first rate. The implementation of Colossal Cave is nothing short of brilliant; rush out and buy it. While you're at it, buy their others too. Simply smashing!"
–SOFT, September 83

"Of the programs reviewed here, the only one that is wholly admirable is Level 9's Colossal Adventure." *– Your Computer, September 83*

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– Computer & Video Games, September 83

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Home Computing Weekly, 30th August 83

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– Which Micro?, August 83

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Screen scene for the Vic

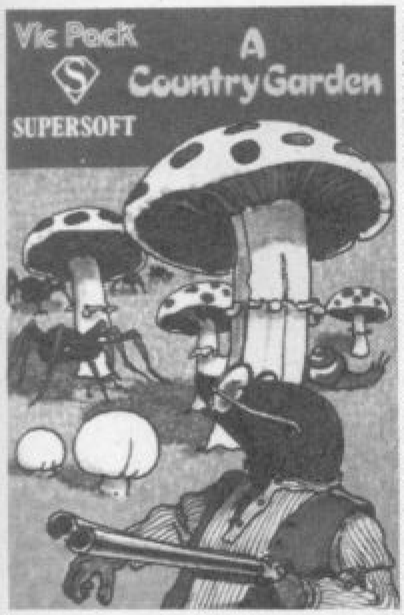
Our regular round-up of games reviews

We get to see a lot of games here at Commodore User, so many in fact that we can't handle all the reviewing ourselves – we farm out some of them, which is why our reviews have someone's initials at the end of them. We look at everything we get, but we don't necessarily print all the reviews we write: instead, we tend to stick with (a) all the best games we come across and (b) those games that you're most likely to find in the shops or the mail order ads.

Our games reviews are separated – this page for Vic games, page 55 for 64 games.

How do we assess them? Well, basically we just play the games. Which may sound obvious, except that all the reviewers have seen so *many* games that they can apply a bit of comparative experience to the evaluation.

We rate games out of five for each of four criteria. **Presentation** means how well the thing is packaged and how good it looks on the screen: dull graphics and poor sound get marked down here. **Skill level** refers to how much skill (of whatever kind) is required to play the game – so if pure chance is involved, the game gets a low mark. (But don't dismiss it on that: some 'chance' games are great fun.) **Interest** is an answer to how well the game did at maintaining the reviewer's interest in it. And **Value for Money** is obvious enough: it's our overall conclusion about how it compares with other games and whether we'd buy it ourselves.



A COUNTRY GARDEN
Vic-20 (+8K)
Keyboard or Joystick
Price £7.95

This is a *Centipede*-style game: your remote-controlled Mole must protect your garden from caterpillars, fleas and snails. The graphics are very clear and moderately clever; sonics are only ordinary (despite the little tune at the beginning).

I really liked this game but I think it needs tidying up a bit. My copy had a magic mushroom that I could shoot constantly, gaining points as I did so: but it never disintegrated so my score just went up all the time. I also thought the way the bonus points were awarded was a bit strange; but I expect that was just me. I especially liked the way this game is playable for a novice or a younger child at first go – it's always good to have an encouraging beginning. For the hardened games freak, however, I think this will not be so much of a challenge. *JDC*

Audiogenic

Presentation:	■■■■□
Skill level:	■■■□□
Interest:	■■■□□
Value for money:	■■■■□

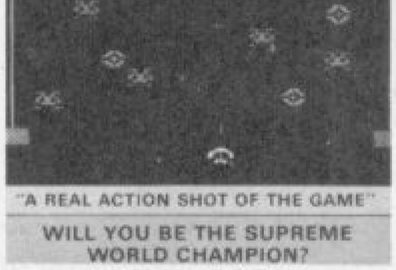
ALPHOIDS
Vic-20 (Unexpanded)
Keyboard only
Price £5.99

Since Romik puts an actual screen photo on its cassette covers you always see just what you are getting – unlike some companies whose artwork is excelled only by their imagination! In the case of **Alphoids**, what you get is an *Invaders*-cum-*Space Rescue* game with extras such as Space Worms that break up and have to be destroyed segment by segment whilst your laser fuel decreases and laser tube overheats and more aliens attack and acid rain falls from the heavens and ...

A very hectic game to play, and an excellent version of this genre – though the graphics are only moderate and the sonics nothing to shout about. The game lacks any conclusion, though, as you don't seem to be able to return to your Mother Ship no matter *how* clever you are – maybe I just wasn't good enough, but the scenario set by Romik doesn't suggest any return to safety. Screen clarity is very good despite the black background. *JDC*

Romik Software.

Presentation:	■■■□□
Skill level:	■■■□□
Interest:	■■■□□
Value for money:	■■■■□



ALIEN DEMON/ PLAGUE
Vic-20 (Unexpanded)
Keyboard only
Price £6.95

Another double game cassette from a name better known for quick and cheap bulk packaging of last month's hit singles. This one had just a hint more to offer than K-TEL's other offering: **Plague** is an *Invaders* game but with a multicoloured, multi-directional feature which made life interesting. Unfortunately there were no instructions with my copy so I had not a clue what it was all about: the Aliens seem to attack from several directions at different levels and over the whole screen. Interesting, but I wouldn't buy unless I had a demonstration if I were you.

I couldn't get **Alien Demon** to load at all so I mustn't be too critical overall. At least worth checking out if you see it in the shops, but I don't think you will be impressed. *JDC*

K-TEL

Presentation:	■■□□□
Skill level:	■■■□□
Interest:	■■□□□
Value for money:	■□□□□

BONZO
Vic 20 (+8K)
Joystick or keyboard
Price £7.95

This 8 or 16K game is a bit like *Krazy Kong*. It involves controlling a little workman to pick up boxes for points while avoiding the Bonzos. Each set has one more Bonzo than the previous one, but the boxes are worth more. Joystick or keys can be used; but if you use a stick, remember to turn the tape off – otherwise it doesn't work and the

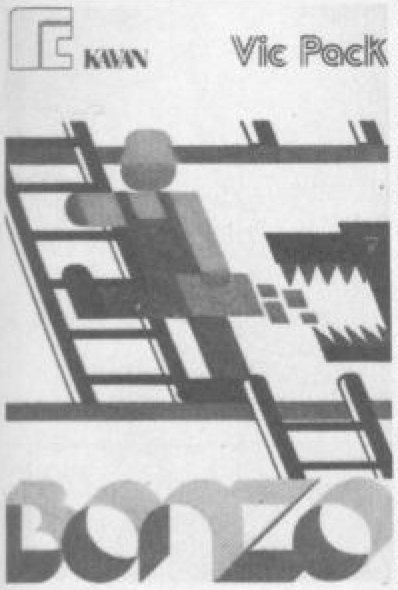
keys do (a point not made in the instructions).

The top ten high-scores can be recorded, up to 10 letters, and a 'rub' facility is provided using one of the function keys.

The game is a bit boring, however; after you lose a life it resets the ladders and boxes, which takes about 10 seconds each time ...
set out.

Audiogenic *RB*

Presentation:	■■■■□
Skill level:	■■■□□
Interest:	■■■□□
Value for money:	■■■□□



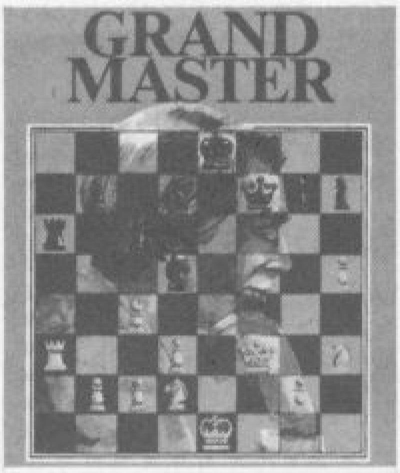
747 PILOT
Vic-20 (+Super Expander)
Keyboard and Joystick combined **Price £6.99**

Up, up and away in your beautiful Vic-20? Alas, no. After a long search for something to make my Super Expander cartridge come alive I was really disappointed with this effort, and it grieves me to say so.

As a flight simulation it is quite acceptable in terms of speed, thrust, load factor and so on; lots of things to keep you occupied as you indulge your Luke Skywalker fantasies. But the graphics are feeble. It hardly uses the Super Expander at all as far as I could see, most of the display being in the form of digital readouts – boring, boring. I would gladly pay twice the price for something that did the job properly. GRRRRRRRRRR!! *(See also the correspondence on this one in the January issue – Ed.)*

Victay *JDC*

Presentation:	■□□□□
Skill level:	■■■□□
Interest:	■□□□□
Value for money:	■□□□□



GRAND MASTER
Vic-20 +8K
Keyboard only
Price £17.95

If you want all the features of chess, this is the one to buy. Nine levels of play, automatic play mode (fascinating), endless choice of screen, border and board colours (great), interlace mode for cranky TV sets, gives hints, allows you to revoke a bad move (cheating), and so on.

Very easy to operate once you have worked out all the commands. And the square board display makes it a bit easier for beginners; I give this one top marks for graphic clarity because of the superb range of colour choices. Don't worry about the levels of difficulty offered by the different programs – almost anyone can win at the lowest level with a bit of practice, and very few players will win at the highest levels: so there is plenty of scope for everyone.

Audiogenic *JDC*

Presentation:	■■■■□
Skill level:	■■■■■
Interest:	■■■■□
Value for money:	■■■■□

JETPAC
VIC-20 (+8K)
Joystick or keyboard
Price £5.50

At last a really excellent and original new game for the Vic-20 with 8K expansion. This is one of the best games we've yet seen for the Vic: and the graphics are so good that it is easy to forget this isn't a CBM 64 game.

Using either joystick or keys, you control a spaceman with a jetpac. He can thrust himself around the sky and fire his impressive quadruple laser blasters at the numerous alients which drift across the screen. The immediate task is to assemble his spaceship which initially is in three parts. Once assembled you collect six fuel elements which appear at random on the screen and drop them onto the assembled ship. At the same time pieces of treasure appear (gold, jewels, etc.) which can be collected for extra bonus points. The spaceship begins to flash once it is fuelled and the object is then to enter the ship without crashing into an alien, and take off for pastures or planets new . . . where you collect more treasure, more fuel and shoot yet more devious aliens.

Almost as exciting as watching Columbia land, this game cannot be faulted – it is thoroughly playable and totally addictive for all members of the family (except perhaps the dog).

WG/PR
Ashby Computers & Graphics

Presentation:	■■■■□
Skill level:	■■■□□
Interest:	■■■■■
Value for money:	■■■■■



PIT
Vic-20 (Unexpanded)
Keyboard or Joystick
Price £7.95

Pit is apparently still selling well, so I had another look at it in case you haven't come across it yet. Hans the Handyman must collect bags of gold from the pile at the right of the screen and get them safely home to his side by dodging the acid rain which is gradually eroding his protective covering. Hans has only three lives in which to grab as much gold as possible.

The graphics are very clear; the walking figure is well simulated; and the whole thing seems bug free. The more gold you get faster falls the acid rain thus making the game harder and harder. That said, I still can't see what is so exciting about this game ...

JDC
Audiogenic

Presentation:	■■■□□
Skill level:	■■■□□
Interest:	■■□□□
Value for money:	■■□□□



OUTBACK
Vic-20 (Unexpanded)
Joystick only
Price £5.50

We're in Hoppy Valley amidst some effective scenery, serenaded by 'Waltzing Matilda'. As Boss Roo, our sole aim in life is to save baby kangaroos from abduction by the Swagmen who are descending menacingly with the aid of balloons.

Thankfully we had the foresight to erect a pulley system on which we can zip up and down with the aid of our trusty joystick. Thus liberated from gravity we can launch our arrows with some precision to burst the balloons. Hit a Swagman, however, and he will retaliate with a boomerang. Oh, and we must keep on the ball in order to hit the bonus object at the top of the pulley.

The scoring is crystal-clear, featuring double height text (such as we can all conjure up – cue for Mike Todd!). Each wave of Swagmen is marked by balloons of a different hue, and nastier tactics.

In short, quite a lot in 3.5K with excellent graphics and sound effects. Definitely addictive.

Paramount Software *LS*

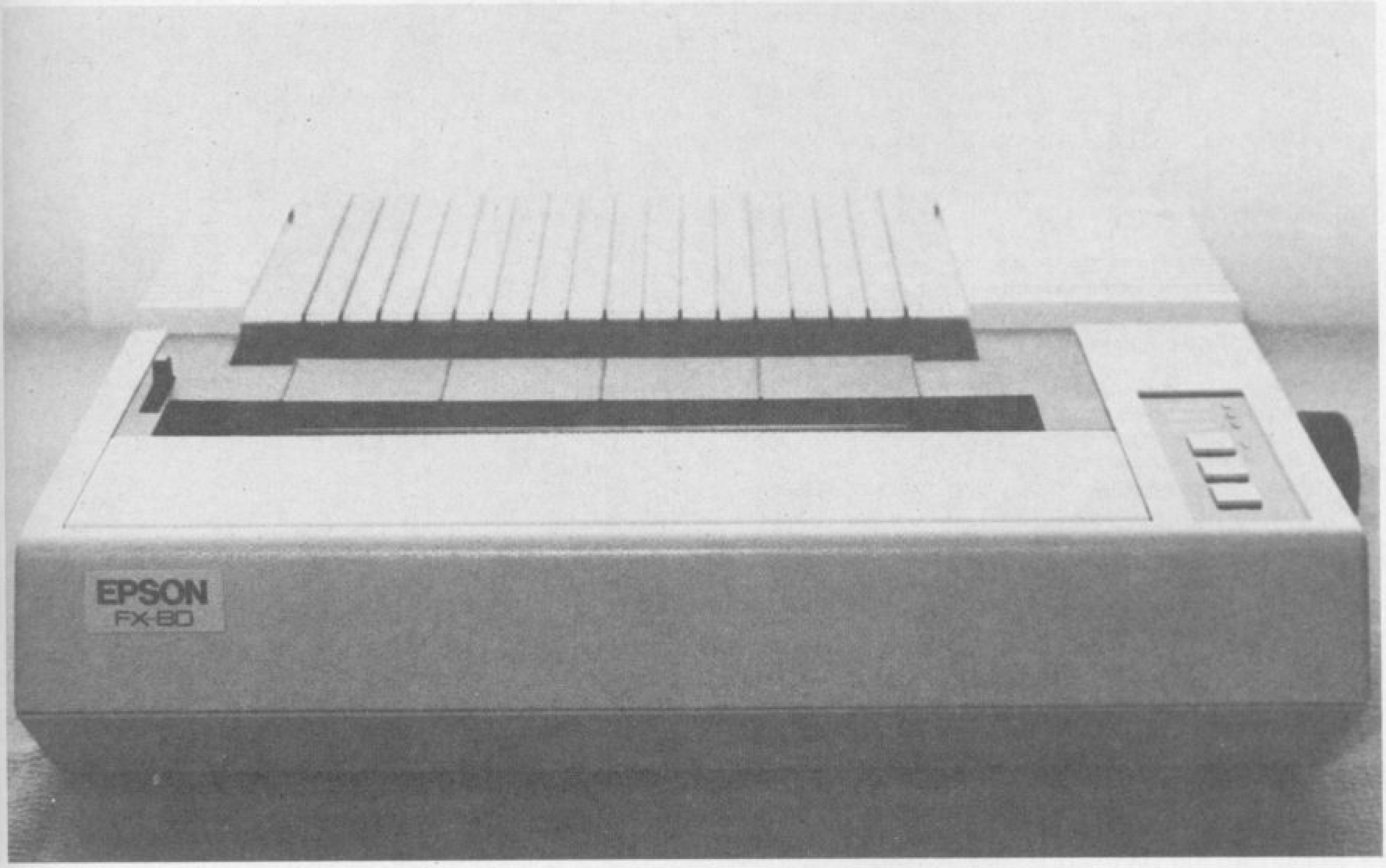
Presentation:	■■■■□
Skill level:	■■■□□
Interest:	■■■■□
Value for money:	■■■□□

Epson and Vic

Down-loading the Commodore character set

by Chris Durham

*Following on from my article on using the Epson FX-80 with the 64 (**Commodore User**, October 1983), it appears that there are readers using an FX-80 with the Vic-20 who would also like to be able to download the Commodore character set. Always willing to oblige, here is a version of the program for a Vic-20 with any size of memory.*



There are a couple of points to note. If you have an unexpanded Vic the program *only* fits if you leave out all the REMarks, including those on the ends of lines.

Second, spaces which have been added for clarity can be omitted – apart of course from those inside PRINT statements.

Next, the control codes have been changed to readable strings. But you must press the relevant keys and not type them out as shown (eg <CLR> means press SHIFT and CLR/HOME).

Lastly, the comments regarding limitations of the program in the 64 article apply equally to this version.

Done it yourself?

For those of you who may have tried your own conversion and had problems, there are one or two funnies when using the Vic which must be overcome.

Because the Vic characters are double the width of those of the 64, the vertical lines are represented in memory by only a single bit in each row; the 64 always uses two bits for a vertical line to avoid colour problems on the screen. Since the program only passes the middle six bits out of eight used on the screen, some characters lose their vertical lines completely. Line 195 in the program overcomes this by adding a new vertical line to the relevant characters.

Also, because the Vic can expand its memory so easily, lines 42 to 45 are needed to check how much memory is available and then reserve space for the character set accordingly. Lines 430 then resets the top of memory pointer; so after typing NEW your Vic will be back to normal again.

Interfaces

For those people considering purchasing an FX-80 for use with the Vic, the majority of the 64 article is applicable. The **Ibek** interface works with both the 64 and the Vic-20, while a separate version of the **RAM Electronics** interface is available for the Vic at the same price of £57.50.

```
10 REM ******************************************
20 REM PROGRAM TO DOWNLOAD COMMODORE CHARACTER SET
30 REM TO AN EPSON FX-80 PRINTER - BY CHRIS DURHAM
35 REM (VIC-20 VERSION - OCT 1983)
40 REM ******************************************
42 IF PEEK(56)=30 THEN TP=24:GOTO45
43 IF PEEK(56)>30 THEN TP=PEEK(56)-5
45 POKE 52,TP:POKE 56,TP:CLR:REM RESERVE SPACE FOR CHAR SET
50 PRINT"<CLR><CUR DN>  SWOP CHAR SET INTO    MAIN MEMORY"
60 CS=32768:CL=CS+512:LOC=PEEK(56)*256+PEEK(55):ML=LOC
70 PRINTCHR$(142):REM SWITCH TO UPPER CASE
95 FOR A=0 TO 511:POKE ML+A,PEEK(CL+A):NEXT A:REM TRANSFER CHARS
100 ML=ML+512:FOR CH=1 TO 27
105 READ X:FOR A=0 TO 7
110 IF CH<25 THEN POKE ML+A,255-PEEK(CS+(X*8)+A):REM TURN INTO REVERSED CHARS
115 IF CH>=25 THEN POKE ML+A,PEEK(CS+(X*8)+A): REM CHARS NOT IN EPSON SET
120 NEXT A:ML=ML+8:NEXT CH
135 PRINT"  CONVERT CHARS TO        PRINTER FORMAT<CUR DN>"
137 DIM B1(8):FOR A=0 TO 7:B1(A+1)=2^A:NEXT A
140 PL=LOC+729:MP=LOC
145 FOR Y=PL TO PL+546:POKE Y,0:NEXT Y
150 FOR Y=PL TO PL+540 STEP 6
160 FOR A=7 TO 2 STEP -1
170 FOR B=0 TO 7
180 IF (PEEK(MP+B) AND B1(A)) THEN POKE(Y+7-A),PEEK(Y+7-A) OR B1(8-B)
190 NEXT B,A:MP=MP+8:NEXT Y
195 FOR A=1 TO 6:READ X:POKE PL+X,255:NEXT A
200 OPEN4,4
210 REM TRANSFER EXISTING EPSON CHAR SET TO USER AREA
215 PRINT#4,CHR$(27);"R";CHR$(0);:REM SELECT USA SET
220 PRINT#4,CHR$(27);":";CHR$(0);CHR$(0);CHR$(0);
225 PRINT"NOW TRANSFER COMMODORECHARS<CUR DN>"
227 FOR L=1 TO 2:READFC,LC
230 PRINT#4,CHR$(27);"&";CHR$(0);CHR$(FC);CHR$(LC);
235 FOR CH=0 TO 31:PRINT#4,CHR$(139);
240 FOR A=0 TO 4
250 PRINT#4,CHR$(PEEK(PL+(CH*6)+A));:PRINT#4,CHR$(0);
255 NEXT A:PRINT#4,CHR$(PEEK(PL+(CH*6)+5));
260 NEXT CH:PL=PL+(32*6):NEXT L
262 REM ALLOW ALL ASCII CODES (0-255) TO BE PRINTABLE
264 PRINT#4,CHR$(27);"I";CHR$(1);CHR$(27);"6";
266 PRINT"NOW TRANSFER CONTROL/ COLOUR CODES<CUR DN>"
268 REM ALSO INCLUDES CHARS NOT IN STANDARD EPSON SET
270 FOR CH=0 TO 26
280 READ CP
290 PRINT#4,CHR$(27);"&";CHR$(0);CHR$(CP);CHR$(CP);
300 PRINT#4,CHR$(139);
310 FOR A=0 TO 4
320 PRINT#4,CHR$(PEEK(PL+(CH*6)+A));:PRINT#4,CHR$(0);
325 NEXT A:PRINT#4,CHR$(PEEK(PL+(CH*6)+5));
330 NEXT CH
335 REM SWITCH TO USER DEFINED CHAR SET
340 PRINT#4,CHR$(27);"%";CHR$(1);CHR$(0);
350 PRINT#4,CHR$(27);"E";:REM SET EMPHASISED MODE
360 PRINT#4:CLOSE4
375 PRINT"<CLR><CUR DN>  COMMODORE CHAR SET          SELECTED<CUR DN>"
377 PRINT"**********************<CUR DN>"
380 PRINT"TO SELECT EPSON CHAR  SET, TYPE:"
390 PRINT"<RED>PRINT#4,CHR$(27);"CHR$(34)"%"CHR$(34)"; CHR$(0);CHR$(0);<BLU><CUR
 DN>"
400 PRINT"TO RE-SELECT COMMODORECHAR SET, TYPE:"
410 PRINT"<RED>PRINT#4,CHR$(27);"CHR$(34)"%"CHR$(34)"; CHR$(1);CHR$(0);<BLU><CUR
 DN>"
420 PRINT"ENSURING STREAM 4 IS  OPEN FOR PRINT OUTPUT.<CUR UP>"
430 POKE 56,PEEK(56)+5:CLR:END
1000 DATA80,5,28,95,92,30,31,94,65,85,86,87
1010 DATA88,89,90,91,18,70,83,19,81,17,66,29,28,31,94
1015 DATA72,90,101,222,239,353,192,223,160,191
1020 DATA144,5,28,159,156,30,31,158,129,149,150,151
1030 DATA152,153,154,155,18,146,147,19,145,17,157,29,92,95,255
```

Forth and the Vic:

Part One — an introduction

by Richard Hunt

"...Begin at the beginning" the King said gravely, "and go on until you come to the end; then stop." (Lewis Carroll: Alice in Wonderland)

This is the beginning of what will become a series of articles about Forth and some of its implementations on the Vic and 64. The intention was originally to review two cartridges and a book, but such is the length of the first of the reviews that I decided to preface it with an article on Forth in an attempt to explain to those unfamiliar with all but the name Forth something of what it is all about.



First I consider it appropriate to set out what it is that I think qualifies me for this task. A reviewer may indeed have many qualifications; or he or she may have (in the magic words of Paul Daniels) "not a lot".

I have to admit that as a computer technician my qualifications are few and untutored. By early training I am a linguist and I have discovered that this can be of help: computer languages obey rules of syntax and grammar perhaps even more than a living spoken language. Application of what are essentially the same disciplines that enable a student to learn one language apply almost equally to a computer language. (A good examination question?)

I began with Forth before Christmas 1982 and am still learning. But as a representative of the great masses who have inquiring minds (you do, don't you?) and consider Forth as a useful extension to one's learning, I feel that I am as qualified as anyone to undertake the task. I offer no further apology to any reader who knows more than I!

Forth is described by the pundits as a 'threaded interpretive language'. As far as I can tell this means that every construction in Forth is 'linked' to the preceding construction – 'threaded' – and is interpreted at the complication stage. From now on I shall refer to a Forth 'word' rather than construction and place any Forth word quoted between square brackets thus [word].

Words worth

"Words are all we have". (Samuel Beckett)

The most vivid feature of the language is its extensibility. At the heart of Forth lies the Dictionary: a quantity of 'words' known as primitives are compiled in the dictionary, essentially as a series of addresses which call up machine-code routines at run time.

Each 'word' is linked to its predecessor, and interpretation begins by searching from the last (most recently-created) 'word' back through the Dictionary until the 'word' is found and executed.

From these primitive definitions new 'words' may be defined, each in terms of and linked to its predecessor in the Dictionary. New 'words" so defined are also compiled with an address, but instead of calling machine-code routines the addresses of the elements of the 'word' are compiled and called as subroutines. (The two main dialects, fig-Forth and Forth-79, differ in the 'words' supplied in the Dictionary but as will be seen deficiencies can be remedied easily.)

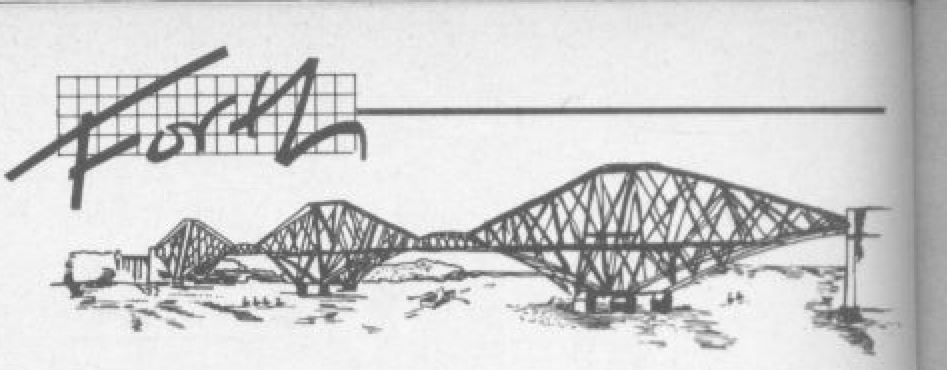
New Forth words are defined by the user by means of the 'colon definition' process. That is, the Forth word [word] may be defined for example as

: word element 1 element 2 element 3;

The colon begins the definition. The name of the 'word' is [word] and its runtime action is defined as elements 1,2 and 3. The definition is ended with the semi-colon.

The equivalent in Basic would be:

```
100  IF A$ <> "WORD"
     THEN 120
110  GOSUB 1000: GOSUB
     2000: GOSUB 3000
120  REM continue search
1000 REM element 1
2000 REM element 2
3000 REM element 3
```



In this way the Forth Dictionary may be extended at will, with each new word linking back to and indeed often dependent on the definition of the previous word.

Other characteristics of the language to note are its use of a data or parameter stack and the infamous RPN (Reverse Polish Notation, or 'Postfix' as opposed to 'Infix' notation).

RPN is characterised by the placing of the mathematical operator after its operand(s) instead of in the position familiar to us in ordinary algebra. For example [2 + 2] because in RPN [2 2 +]. (Note: Forth demands at least one space between each word. Numbers, even, are treated as words.)

To return to the simple sum above, Forth places the arithmetical sum (4) on the top of the data stack, deleting in the process the two operands. In this way stack manipulation permits much speedier number crunching and avoids to a large extent the declaration of large quantities of variables as in Basic.

There are some other features that should be mentioned. Most Forth systems use a screen of 64 columns by 16 rows, 1024 characters maximum per screen. (Where have I seen this number before?) Forth systems of source code are transferred back and forth (excuse me – small f!) between disk and disk buffers which are accessed for display by a [list] command. This too makes for speed and efficient, automatic storage of source code.

The implication is that a cassette-based system is less well suited to Forth, and that an implementation of Forth for a home computer such as the Vic is likely to be limited in this direction...

Disciplinary Proceedings

"Discipline must be maintained ..." (Charles Dickens, Bleak House)

The technique for writing programs in Forth differs from programming in Basic, especially if you expect to sit down at your machine and compose code directly on to the screen. It is probably true that a Forth program is always conceived on paper first, so that each step may be duly considered and its most primitive 'word' identified and compiled first.

This is sometimes described as 'top down' programming, though in one worthy periodical recently I saw it described as 'backwards' programming! In effect the object of the program is stated at the outset and then in increasing complexity the detail of the individual modules and routines derive from this object.

It can bear repeating that a new word can be defined only in terms of existing words. Therefore logical thought and construction is imposed upon the programmer even before he or she starts to compose source code. In other words, the programmer must define the complete structure and content of the program so that the most primitive levels of word definition are identified. Discipline!

The concept of discipline in programming seems to be something of an anathema, certainly to our younger brethren who are brought up on Basic and interactive machines in the home and at school. There is a serious argument that Basic is *not* a suitable language for beginners after all, simply because program structure can be nonexistant unless it is imposed from outside. Forth does not have this disadvantage.

Moreover, it is faster in execution than Basic because of the way a system is constructed. Forth's inventor (if that is the right term), one Charles Moore, produced it because he saw a need for greater productivity in terms of program output. Forth is designed to test and debug code as it is entered to the computer: it is fast in every sense.

For these reasons then, I commend Forth to you for serious study and, equally important, for the mere fun and enjoyment of creating your own words!

Next issue I review the VIC-FORTH cartridge produced by AB Datatronic in Sweden and sold here by Kobra. Following that will be a review of *The Complete Forth*, a new book by Alan Winfield published by the Sigma Technical Press; and a review of the Audiogenic Forth cartridge is on the stocks too.

For further reading, essential to the reader who wishes to learn Forth properly, there are a number of books that can be recommended. The standard textbook has undoubtedly been *Starting Forth* by Leo Brodie (Prentice-Hall); *The Complete Forth* by Alan Winfield is also good.

Exposition

The range of books for the Vic-20 seems to grow daily. This one is from Melbourne House, which has a pretty good track record for books and games: it's edited by John Vander Ryan with material from several authors.

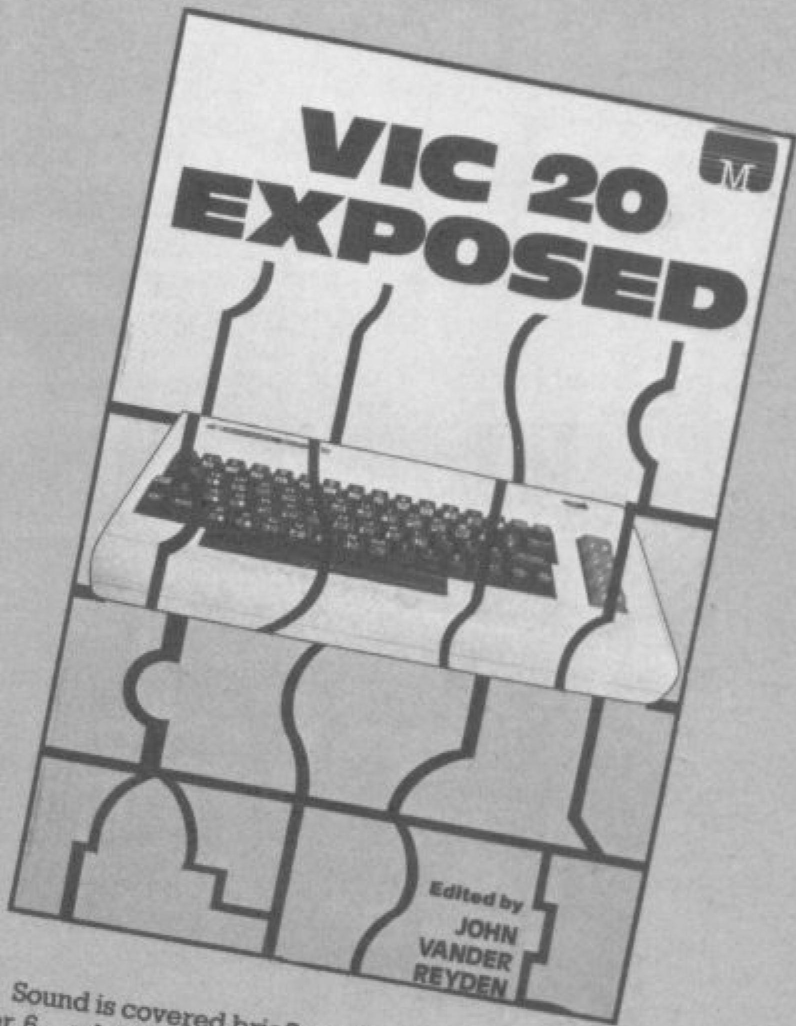
Its scope runs from the initial principles of Basic programming, with every function and program variable explained, through the techniques of graphics and sound and so to using joysticks, paddles, disks and cassettes. There are also chapters devoted to understanding how the Vic works and some on machine code – what it is, how it is used.

First impression – the unique style of the first chapter. It consists of many well-pointed and concise notes and hints on more aspects of Basic programming. This is developed further in chapter 2, which looks at all the Basic commands in alphabetical order; you get descriptions with examples in a useful reference form.

The style changes slightly for chapter 3, Advanced Basic Techniques. Amongst other things it explains how to keep programs short, how to append and merge programs, and how Basic programs are stored.

Graphic techniques on the Vic are far from simple and chapter 4 explains the techniques, including the problems of where to put everything inside the Vic. By this point in the book, the overall writing style is becoming a bit muddy; but it is certainly quite understandable.

High-resolution graphics are first explained assuming a minimum of memory available, and this results in a tiny high-res screen of 64×64 dots. It does however go on to explain how the full screen can be set up if enough memory is available. Like the rest of the book, the chapter contains a few example programs, although they assume that the screen starts at location 7680 (in other words, that the maximum expansion used is 3K).



Sound is covered briefly in chapter 5, and the cassette unit in chapter 6 – which also goes on to examine the disk drive. This section deals with all the disk commands available, but spends most of its time examining more advanced commands such as BLOCK-ALLOCATE and BUFFER-POINTER and does not cover normal disk techniques in any detail. The printer is also examined in this chapter, but very briefly. Chapter 7 is four pages on how to use the joysticks and keyboard, with a few lines on games paddles.

Chapter 8 takes a close look at the hardware, describing how some of it works. It includes a diagram of the inside of the Vic, showing what each section of the circuit board does.

Machine code is the logical follow-on from all this. Like the Basic section of the book this is not a tutorial; beginners may find it rather difficult to learn machine code from the text. It does have useful tips on where to put machine-code programs and how to save and load them.

Finally there are several appendices covering the usual character tables, memory maps, KERNAL routines and so on. Appendix I contains a description of some of the many routines in the Basic ROM which could be of use to the more advanced machine-code programmer.

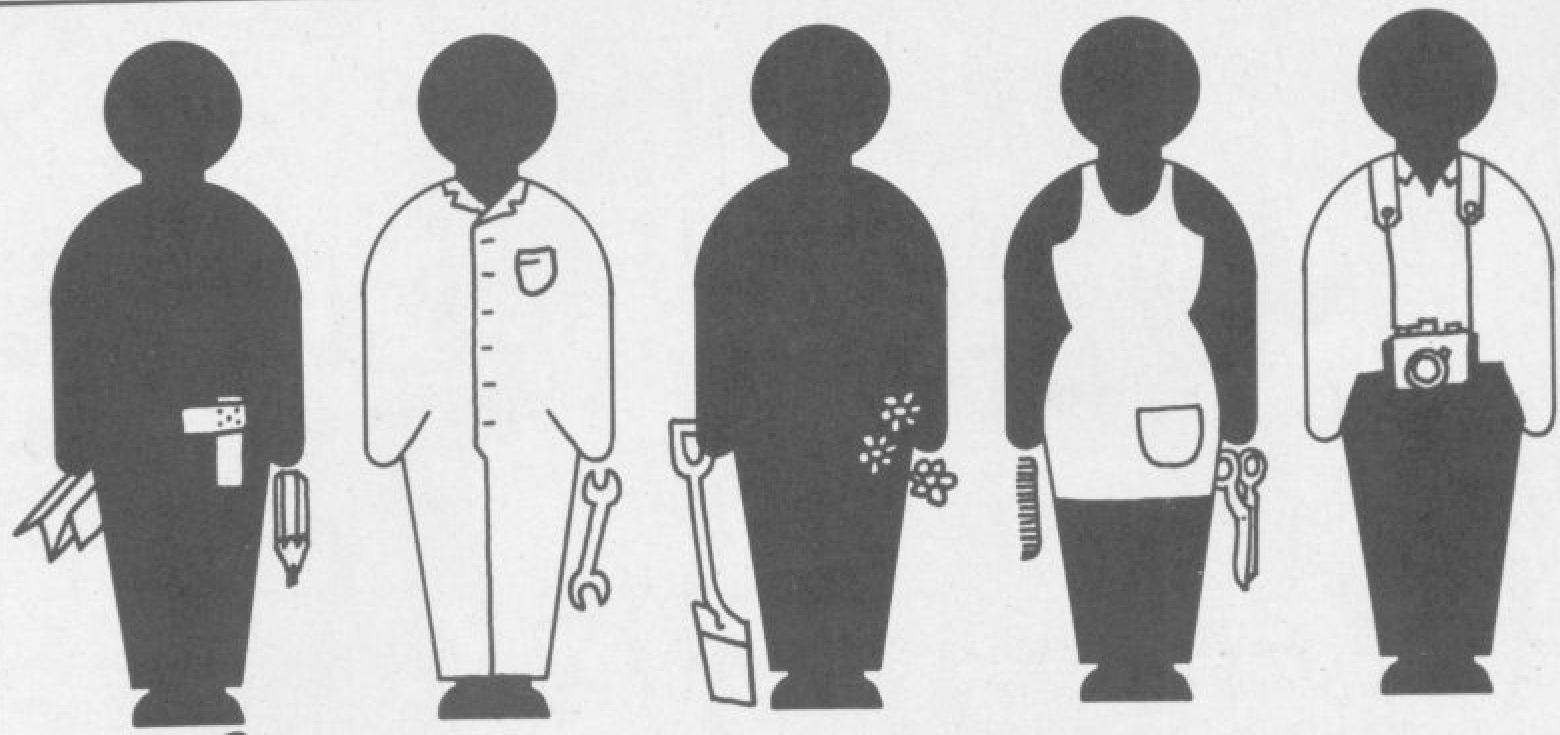
Overall? Generally speaking the book is well put together, with useful examples throughout – though not without the occasional error. The presentation is sometimes difficult, where tables are not well laid-out and program listing are typeset rahter than printed directly from listings.

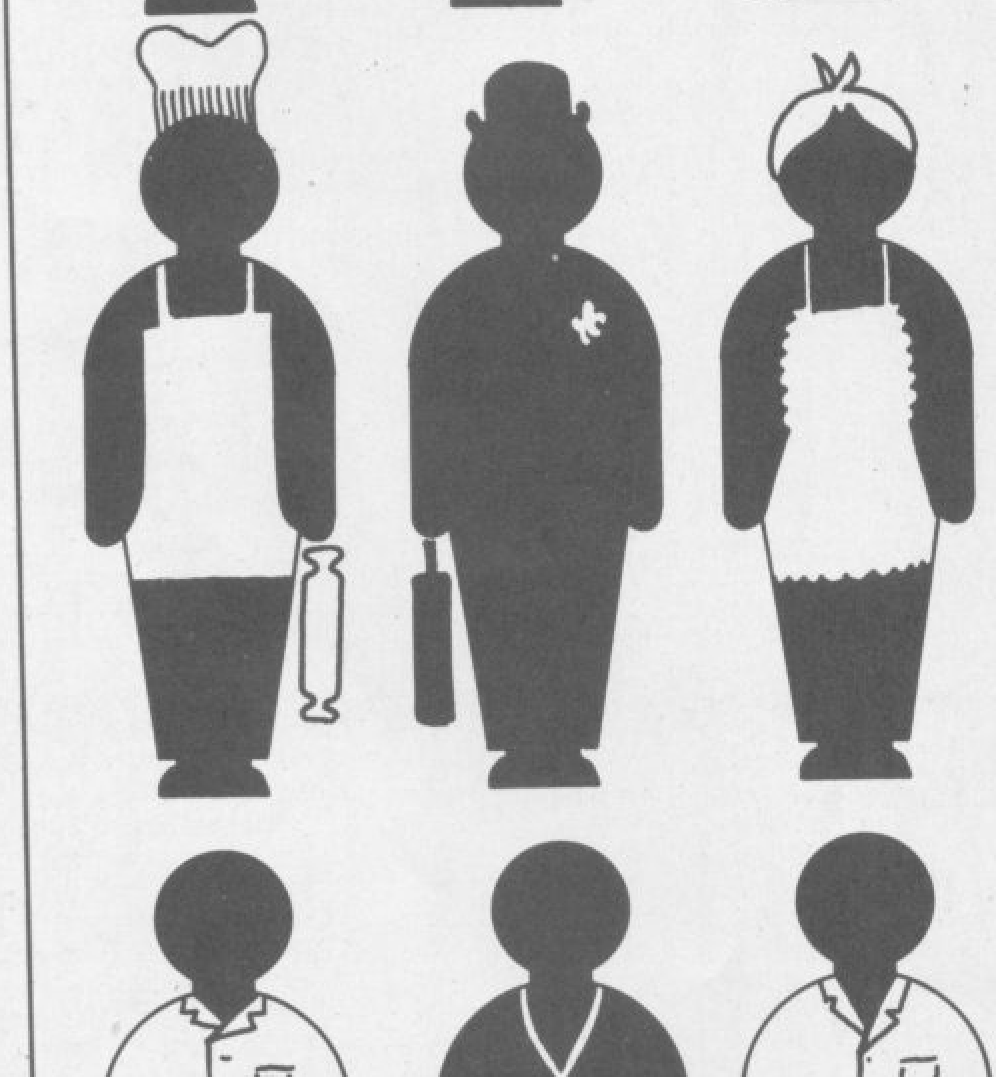
The section on cassettes and disks could have been better, with descriptions of the techniques that are most needed yet often least understood – rather than the esoteric examination of some disk commands, surely out of place in such a book.

***Vic Exposed* has fallen into the all too common trap of trying to cover too much in too small a space. But nevertheless, as a book of expositions, it is a great improvement on the book of revelations. Value for money? Well, at £6.95 I'd give it 7 out of 10.**

Vic-20 Exposed

The Book:	Vic-20 Exposed
The Author:	John Vander Ryan (Ed)
The Publisher:	Melbourne House
The Price:	£6.95
The Reviewer:	Mike Todd
The Conclusion:	Pretty good value





Codewriter puts computers within everyone's grasp !

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In Business . . . . . .

Business on the 64

An introduction to business packages

With all that memory and processing power the Commodore 64 is bound to tempt some people away from games to more serious applications. Anyone with business interests and a Commodore should sooner or later ask the question: what can this machine do for my business?

Tony Harrington offers some answers – and some advice.

It is a very specific sort of question, to do mainly with price. If you're considering a 64-based business system you are thinking about a different beast from the £1,500-plus business micros like the IBM PC, the Sirius, even Commodore's own 'big' business systems like the 8032 and the 700.

How different? Well, the minimum configuration you can get away with as far as using the 64 for business is concerned is the computer, the cassette recorder and Commodore printer. In price terms this is less than a quarter of the cost of what I would call the mainline micro-based business systems.

But it's all swings and roundabouts. You save money on this low-cost configuration: but you lose out on the benefits of fast data storage and information retrieval that comes with disk-based programs and plenty of storage and processing power.

Programs written for the business micros take advantage of the fact that the twin-floppy drive set-up can use both a *work* and a *data* disk. The programs, needless to say, can be larger and more complex than anything you can get on a cassette. And they can do all the good things that fast read and write facilities allow.

The business programmer working with a cassette-based 64 has to do everything within the internal memory capacities of the machine. He or she can't expect the user to save everything to a cassette every two or three minutes: it would be too slow and too dull.

Yet despite these restrictions, there is no shortage of cheap business packages for the 64. A number of different business programs by various suppliers aim to use the 64's potential to solve your accounting problems.



The crunch

But before you rush to computerise your business on a shoe string budget, consider this: **the capital investment cost is just the tip of the iceberg as far as business systems are concerned.** No matter what computer and what programs you buy, the real costs are in setting up and maintaining a working system. It takes hours and hours to key in the data for even a minimal accounting system.

And if you do all this and *then* find that the programs you have bought are inadequate for the job, a lot of effort will have gone for nothing. If you have staff that are involved, you might well succeed in frightening them off computerisation for good. At the very least if you decide to press on with a different supplier's programs after one disaster you'll have to do all the data entry work all over again.

The other aspect of the problem is that when you start shifting your vital business records on to a computer, you run a major risk. Lost data here doesn't just mean a few hours of programming time wasted – unless the right precautions are taken it can mean losing track of vital transactions and invoices. Cash that *should* have come to your pocket *won't*: and invoices that you should have paid won't be met. The result? Trouble all round.

The good news

On the other hand, if it *is* done properly, then computerising your accounts should mean just the opposite. It should mean increased efficiency, prompt access to vital data and the smooth generation of reports. invoices and accounts.

Before looking at business programs for the 64, it is worth asking yourself what you should expect from such applications. Accounting systems cover the sales, purchases and nominal ledgers, stock control and sales invoicing as well as other, more exotic applications like sales order processing and bill of materials.

Payroll is a separate area and needs to be considered in its own right. I am going to limit this introduction to a consideration of the three main ledgers. namely sales, purchase and nominal.

The sales ledger

In a sales ledger the basic requirements stay the same regardless of whether you keep the books by hand or on a computer. You need a customer master file and you need to keep track of the current transactions between you and your customers.

The sales ledger programs provided by leading suppliers of business systems software for the £1,500-plus machines vary primarily in the amount of detail you can record on the customer master file. When it comes to cassette-based programs for the 64, the limitations on this sort of data become quite drastic – as we will see in future reviews.

In general you need to record the **customer name, an address** and **the telephone number.** You will also want to be able to identify each customer by a unique **customer account number.** You might also want to keep additional details like the **credit limit** assigned to each customer and a **contact name** at that customer's site.

Sales ledgers can be run as either a balance brought forward or as an open-item system. The difference is that in a **balance brought forward** system, the history of what has happened between you and any particular client is cleared off the system at the end of each accounting period. All that is carried forward is the balance still owing on that account. (In the more sophisticated balance-foward systems, that balance will be 'aged' – that is, it will show how much of the amount has been outstanding for 30 days. 60 days and so on.)

An **open-item** sales ledger, by contrast, keeps a history on each customer's account of all *transactions* that have not yet been paid off. If someone buys 50 crates of widgets off you and sends in a cheque for 30 crates at the end of the month, the account (once it has been updated) will show the date that the 30 crates were paid for, and it will display the fact that there is an amount still owing for 20 crates.

With both systems, the only way to keep a full record of all the transactions (both fully paid-up and still owing) that you have done through a year is by the regular printing and filing of all the postings to all the accounts.

The *postings* routines (that is, the procedures for entering transaction details against customer accounts) should be able to cater for different types of transactions. At the very least, the system should recognise the difference between an *invoice* and a *credit note*. If someone is returning goods for whatever reason, and being credited for them it is not enough to post a negative balance to his account: You need to be able to put through a proper credit note.

Because customers, particularly companies, tend to pay lump sums which you (or your sales clerk) then have to allocate against particular transactions, you need a way of handling *cash allocations.*

To get the best out of your computerised system you need reasonable *reporting* facilites. After all, if you are holding data on all your customers, why shouldn't you be able to sort it and analyse it quickly and easily? That's what computers are supposed to be good at, after all.

So in addition to your sales ledger *day book,* with its history of all the transaction postings, you should be able to get reports on things like *credit limits, sales analysis* reports, *turnover* and so on. Customer *statements,* of course, are a necessity and the system should produce these as a matter of course.

But remember: the more information you want to process and store, the harder it gets for a cassette-based system to cope.

Purchase control

Purchase ledger systems have a lot in common with sales ledger packages. The sales ledger keeps track of what is owed to you: the purchase ledger does the same for amounts you owe to others.

Because they deal with payment, many purchase ledger packages have additional facilities for producing printed cheques or bank giros. You are unlikely to find this kind of sophistication in cassette-based programs for the 64. But, as with the sales ledger, you *will* need a *master file* and a *transaction history file,* as well as a set of *posting* routines to update and maintain both files. And you will want to be able to get *reports* from your system.

In place of the customer master files, you will need a *supplier master file.* Ideally, the supplier master file will be able to record the *discounts* offered by various suppliers: this simplifies the preparation of remittances.

Anything claiming to be a purchase ledger program should be able to show you *the year-to-date value of all the purchases made from any particular supplier* and at least *the current period payments* to that supplier (with printed records of previous period payments). It should also provide an *aged analysis* of items you have left unpaid.

Remember that you will probably want to pay certain suppliers the same amount every month. So a facility for automatically generating these *remittance notes* and updating the supplier accounts with the values is definitely handy. Again, though, this is likely to be beyond the scope of a tape package.

You will also want to be able to look through a *pre-payment listing* of what you owe to all your suppliers so that you can make up your own mind how much to pay to whom. There should then be some simple way of going through and paying each account. This again assumes that the package can generate proper *remittance notes.*

The more sophisticated PL packages allow you to use selection criteria to generate payments. For example, you might tell the program to pay everyone you have owed more than £100 for over 30 days. This sort of refinement involves fairly extensive sorts and searches on your data, and once more it's hard to do on cassette.

Because there will be occasions when you will get a refund from a supplier (for damaged goods, or whatever), the purchase ledger system has to have a way of recognising *credit notes.*

Posting *transactions* to the PL should be as simple as possible. They will be based on the invoices and credit notes sent to you by suppliers, plus any journal adjustments.

Because postings are normally done in batches, the program should have all the necessary *controls* associated with batch entry. For example, batches should be totalled before they are entered. This 'control total' then acts as a check to see that all the amounts in the batch have been entered correctly. The program should not allow you to finish a batch until the amounts input on all the invoices add up to the control total.

You will not always want to pay a particular supplier in full at any one time. Alternatively, you might want to pay two or three different invoices for that supplier simultaneously. Because of this, you need a facility for *allocating payments across several invoices* in a supplier account.

As far as management information from the PL is concerned, in addition to the *payment listings* you should demand an *aged creditors* report. You'll also need one which shows the *total invoices* posted for the accounting period broken down into goods values, VAT values and goods plus VAT. This last report should also show the total cash paid out by you to your suppliers for the period and the total of any credit notes received. If you can get all this from a cassette-based program, you will be doing very well.

Nominal ledgers

The last of the three main ledger programs is the nominal ledger, sometimes called the general ledger (especially in the States). It's at the heart of any accounting system: it consists of a series of account headings under which you classify all your income and expenditure, and it aims to provide you with a total picture of what is happening to your business.

Because it is a complex program which works best when it is fully integrated with other ledger programs (so that values can be transferred and accounts updated automatically), this is not the sort of program that can be squeezed on to a cassette. Nominal ledger programs on tape usually limit themselves to adding up what you are owed and what you owe: so they present you with just two totals, rather than a detailed analysis of your business.

The reviews

We have a series of reviews over the following months on ledger programs – next issue we look at the cassette-based SIP accounting system. You can draw your own conclusions on whether this type of package meets the requirements I have outlines here. It's all a question of deciding what you can live without.

Fun

Instant Competition

Win a Vic or Commodore User sweatshirt!

It's simple to enter: write a one-line program

No real restrictions, though we do ask for *original* offerings – and do use the form below! But you can use Vic or 64, and on the Vic you can assume any memory size and/or the Super Expander if you want.

If you want to submit more than one entry, you're welcome to do so: at least one of them must be on the form, the others should be on a separate sheet *with your name and address on the sheet.*

The five best entrants, those with programs that do as much as possible in a single line, get Fame. Exposure, Success, and a sweatshirt (not necessarily in that order).

Use the form below. Remember, you can use Basic abbreviations in you 88-characters-per-line maximum. and if you call it line '1', that saves one whole character ...

WINNERS OF THE DECEMBER SINGLE-LINE COMPETITION

A surprisingly small number of entries for this one, but some surprisingly good ideas among them. Here are our five sweatshirt winners (in no particular order of merit!): all but one run on the unexpanded Vic. Bear in mind that you'll have to use abbreviations (Appendix D of the Friendly User Guide) to enter them.

```
1 PRINT"TIMES TABLES":INPUT"NO";A:FORI=1TO12:PRINTA"TIMES"I"="I*A:NEXT
:POKE198,0:WAIT198,1:GOTO1
```

★ Filippo Pozzi *of Voghera, Italy*

... a good joke. Took us a minute or two to get it, though

```
1 POKE36879,243:POKE646,RND(1)*8:PRINTTAB(226)"MERRY XMAS":
POKE218,158:POKE7724+RND(1)*22,42:GOTO1
```

★ J A Tully *from Brighton*

... colour balance could do with some adjustment, but a nice idea.

```
1 POKE36869,255:PRINT"@@@@@@@@@@@@":FORX=7168TO7175:POKEX,PEEK(X+1):
NEXT:POKE7176,PEEK(A+815):A=A+1:GOTO1
```

★ Mark Dooling *from Dewsbury*

... neat and clever mileometer-style scrolling: could be very useful as a subroutine

```
1 GRAPHIC2:SCNCLR:A=510:POINT2,A,A:FORT=0TOASTEPRND(8)*3+1:
DRAW2TOA+COS(T)*(A-T),A+SIN(T)*T:NEXT:PRINT"RRR":RUN
```

★ Chris Ratcliffe *from Malvern*

... needs Super Expander – and it's so tightly packed that hitting return at the end of the typing will not actually enter the line. You have to cursor back and press return a *second* time. Clever and impressive, though

```
1 PRINT"TIMES TABLES":INPUT"NO";A:FORI=1TO12:PRINTA"TIMES"I"="I*A:
NEXT:POKE198,0:WAIT198,1:GOTO1
```

★ B R P Wedge *from Folkestone*

... an apparently foolproof and accurate multiplication table

SINGLE-LINE COMPETITION

Entry: ☐☐

☐☐

Name: ____________________

Address ____________________

Preference: ☐ Commodore User ☐ Vic Computing

Size: ☐ S ☐ M ☐ L ☐ XL

Send to: Competition, Commodore User, The Metropolitan, Enfield Road, London N1 5AZ.

64 BOOK LOOK

The front cover of Owen Bishop's *The Commodore 64 Games Book* proudly boasts '21 Sensational Games'. Well, that is not quite the case. The games pay the penalty of being written in Basic: they are *slow*. Only one, *Bomb Run* uses a machine-code routine to scroll the screen horizontally; but the rest of it is in Basic, resulting in a sluggish response to the controls and an overall jerky appearance. In general the graphics are coarse and the sound effects rudimentary.

On the other hand the principles of the games are simple, but some of the ideas are good. *Sniper*, for instance, is an excellent concept; and if converted to machine-code with high-resolution graphics could be a best seller.

The book consists of 132 pages containing 21 games programs listed originally on a Commodore dot matrix printer. The introduction warns of the legibility problems associated with such listing and the documentation describing each program includes a table of control key sequences and the lines on which they occur: very sensible. There is also some good advice about saving your programs before RUNning in case your 64 has a fit on encountering a mistake ... And I was glad to see that Mr. Bishop does not use the variable names I or O; in his programs to avoid confusion with 1 or 0: again very sensible, and to be encouraged.

Each game is presented with a (rather fuzzy) monochrome photograph. The background and purpose of the game is described and a full description of the controls given together with recommended tactics. To reduce the amount of typing the listings do not contain REMarks; instead the program is described separately together with any interesting programming points. The listings are just long enough not to become too tedious to type in.

The second in our brace of identically-priced similarly-named 64 games books is 192 pages long and offers 30 games. Better value, therefore? Well, the paper quality is poorer than Bishop's book; and the print is smaller too.

In order to avoid the problems of dot-matrix printer listings, the programs are printed with special control characters. A character is introduced to indicate the presence of spaces – a good idea since the number of spaces in a long text string can otherwise be ambiguous.

Again each program is accompanied by an out-of-focus over-exposed screen photograph. Very brief instruction and program structure precede each listing.

The majority of the programs are very long; and unless you're a very good typist, they will require several sessions to complete without you becoming cross-eyed. And as far as programming technique is concerned, Mr Bishop has nothing to fear from these two gentlemen. They use 'T' as a variable name, they start programs at line number 0, and they increment the line numbers by 1; not recommended.

When writing such a book the authors should try to reduce typing to a minimum. It seems as though the Remshaws have tried to incorporate a typing tutor in to their book. At times they use five-figure line numbers, and there are numerous occasions where five-figure PEEK/POKE addresses are used throughout the program when they could have been replaced with a single-character variable.

They do not seem to have heard of subroutines, either. In one program three pieces of code are each used on three separate occasions.

There are more machine-code routines in these programs, but again they are so deeply embedded in Basic that the end result is still slow. On the other hand the graphics are far superior to Mr. Bishop's, often incorporating user-defined characters and sprites.

At the end of the book are four appendices. The first contains some hints on problems which may be experienced whilst entering programs, and how to overcome them. All the games use the keyboard for controls: appendix two lists a crude conversion routine for joystick control. The third and fourth appendices have a Basic listing for a sprite generator and an assembler listing for horizontal screen scrolling.

At first sight these two books offer dozens of games for the price of one cassette. But arcade-quality action games are written in machine code to cope with the multitude of seemingly simultaneous events: the odd machine-code routine in our otherwise Basic program does not offer a great increase in speed. It is frustrating and demoralising to spend hours typing in a long program only to find it fails to meet the promises of the introduction.

Besides, even if the listing is correct you are bound to make typing errors. So the program must be debugged – which may take at least a couple of hours, representing up to 60 hours' work for one book.

Neither book teaches much about programming, and their only advantage is that your typing speed should improve ... I cannot recommend either book. Spend your £6.00 instead on a good-quality cassette game like *Gridrunner*. Or, better still, buy a book on machine-code and learn to write your own!

The Commodore 64 Games Book



The Book:	The Commodore 64 Games Book
The Author:	Owen Bishop
The Publisher:	Granada Publishing
The Price:	£5.95
The Reviewer:	Ken Ryder
The Conclusion:	Good as a games primer but not for games-playing. Save your money ...

Commodore 64 Games Book



The Book:	Commodore 64 Games Book
The Authors:	Mark and Clifford Remshaw
The Publisher:	Melbourne House Publishers
Price:	£5.95
The Reviewer:	Ken Ryder
The Conclusion:	Variable quality, not great games. Save your money ...

Word Processing Road Test:

Another processor under the microscope this month. Chris Durham takes his scalpel to the all-British Vizawrite to find out what lies under the glossy wrappings.

Vizawrite 64 was written specially for the 64. It is now available in cartridge form as well as the disk version we reviewed.

Vizawrite allows over 35,000 characters of text, an impressive figure – especially when you consider you can link files together for printing as well.

There is also an associated spelling checker, Vizaspell, and the amount of text that can be checked in one chunk will be the limiting factor when you use both together. (Vizaspell is the subject of a separate review; it's due to be published later this year.)

Functions available

After loading the program you get a menu from which you select options by using the function keys. Creating a new document or loading an existing one requires you to enter the name of the document. Unlike other WP programs I have used, this one uses the document name for filing and other disk operations, so avoiding the need to retype the same name every time (changing the name is easily done by pressing the CBM 'command' key and 'n' – typing the new name then renames the document).

The name is always visible on the top line to remind you which document you are working on.

Vizawrite formats as you type, allowing up to 241 characters per line. The screen scrolls sideways as you type and any word which will not fit on the end of a line is recreated in full on the next line. Using a hyphen allows you to break a word at any point; if the part word will now fit on the previous line it is moved back.

For those people who like to be able to see all the text while typing, there's a neat trick; pressing CBM and 'w' immediately changes the text width to a displayable 38 columns. The 'w' of the word '*Vizawrite*' on the top line is then highlighted to show you are in 'narrow' mode; repeating the command again automatically reverts to the width originally specified.

It doesn't take long to realise that Vizawrite is extremely easy to use. The majority of the commands use a single letter, and you can almost guess what the commands are without having to look them up. Any command which would have dire consequences if used by mistake has a safeguard; you have to press RETURN to confirm, or else move the cursor to indicate a block of text. Pressing RUN/STOP will cancel any command made in error.

Block commands are simple; for example, to move some text you position the cursor at the start of the text you wish to move. Pressing CBM followed by 'm' changes the cursor to white and you are free to move the cursor along the line, down the page or even jump straight to the end of the page. All the text that the cursor has passed will turn white. When you have highlighted the relevant block you press RETURN. You now position the cursor where you want the text moved to and press RETURN again; the text is then changed.

The same method is used for block deletes and copies. Single-character inserts and deletes are done using the normal screen editing facilities.

Because Vizawrite formats as you type there are no embedded control commands – apart from ASCII codes for the printer, of which more later. Instead, the CTRL key is used much as CBM to allow direct control. So CTRL followed by a 't' is the tab, CTRL and the full stop is the decimal

VIZAWRITE 64 COMMANDS

Commands initiated by the CBM key	
c	Copy text from one part of the document to another
d	Send a disk command
f	Find an exact phrase in the document
F	Find a phrase in either upper or lower case letters
g	Go to specified page
m	Move text from one part of the document to another
M	Merge a document or other WP file
n	Rename the document
p	Print the document
q	Quit to the activity (initial) menu
r	Replace a single phrase by another
R	Globally replace a specified phrase with another
s	Save/Replace the document on disk
t	Change colour tones
w	Overide document width to equal screen width
$	Display disk directory on the screen
DEL	Highlight and delete text from the document
INST	Insert text into the document
SPACE	Display number of characters free

Function keys	
f1	Page forward
f2	Page back
f3	Next screen of text
f4	Previous screen of text
f5	Move cursor to next tab or end of line
f6	Move cursor to opposite end of line
f7	Insert text into the document (repeat to end insert)
f8	Highlight and delete text from the document

Control (format) commands following CTRL key	
c	Centre this line
e	Turn emboldening on/off
i	Indent paragraph (ended by RETURN)
p	Page ending
s	Subscript
t	Tab
u	Turn underlining on/off
.	Decimal tab
↑	Superscript
#	Replace by printed page number
0-9	Send assigned ASCII code
m	Merge point (for mail-merge)
d	Don't merge (separates merge records)

PULL OUT

COMMODORE user

A PARADOX PUBLICATION

DEALS FOR READERS

Our New Mail-Order Catalogue

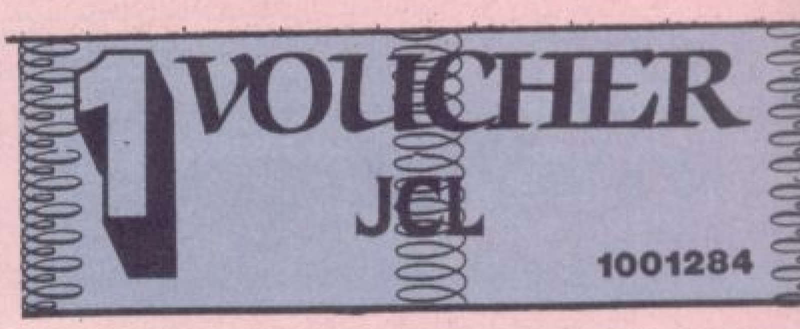
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The deals

We have fixed up some deals for readers for a number of suppliers of Vic and 64 products. It's easy — and offers you substantial savings on a whole range of products!

This month JCL are giving you another chance to take up their special deal and next month we'llhave more deals lined up for you.

Collect the approrpiate number of coupons from successive issues of the magazine — the number you need varies from one supplier to another. When you have enough to claim your discount you send off the coupons with a cheque or postal order to the supplier in question (NOT to us!).



Welcome to DEALS FOR READERS, a collection of Special Offers from Commodore User magazine.

This Catalogue offers you excellent deals on Vic and 64 products. Some of them, like the dustcovers and the Victuals tapes, we have produced ourselves. The others are things that we regard as Good Ideas and Good Value, mostly items we reviewed in Commodore User before we decided to sell them. On most of those we have fixed up discounts for readers (while we aren't allowed to sell books at a cut price, we can include P&P in our price).

If you want to take up any of the offers, just use the Order Form on the back page. And take a look through the Catalogue: even if you don't want to buy now, we'd like to know what you might be interested in seeing in future DEALS FOR READERS catalogues — let us know in the space provided on the Order Form.

A BETTER BASIC FOR THE 64

£17.95



In the December issue you'll find a review of Simons' Basic, the 'official' Commodore cartridge that provides extensions to the 64's standard Basic. We compare it with a tape called BC BASIC that does much the same kind of thing; and BC BASIC came out so well that we subsequently fixed up a discount deal for readers.

BC BASIC provides a set of extra commands for graphics, sound, I/O and miscellaneous programming. We concluded that it's much more professional than Simons' Basic, and since it's considerably cheaper it is much better value for money — especially at our price! Simon's Basic is £50; BC Basic normally sells at just £19.95, and you can order it from us at £17.95.

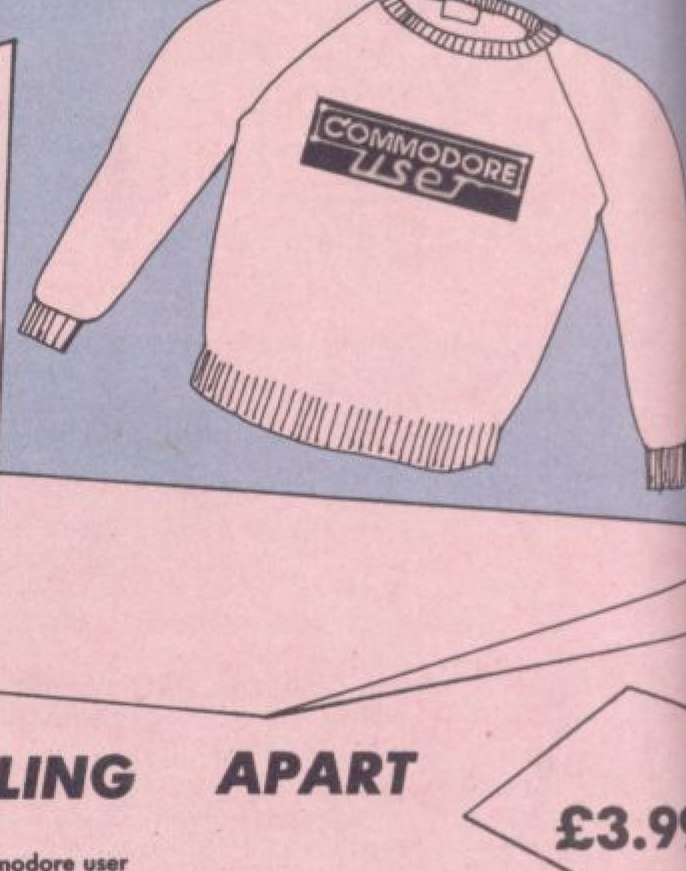
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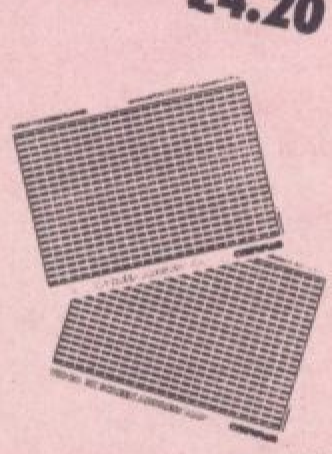


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VIC: ALL YOU NEED TO KNOW

VIC 20 User Guide by John Heilborn and Ran Talbott, published by McGraw-Hill.

There are dozens of books about the Vic. But this one is the best all-rounder we've come across. Not cheap, maybe: but you get a beefy large-format paperback of 387 pages, packed with information and beautifully presented with professional illustrations and clear listings.

Ideal for beginner and expert alike. Hand-holding intro to the Vic; but also includes 'how to use' sections on disk and printer as well. Excellent on graphics and animation, on writing games, on sound (eg a good chunk on combining sound and animation).

£10.95

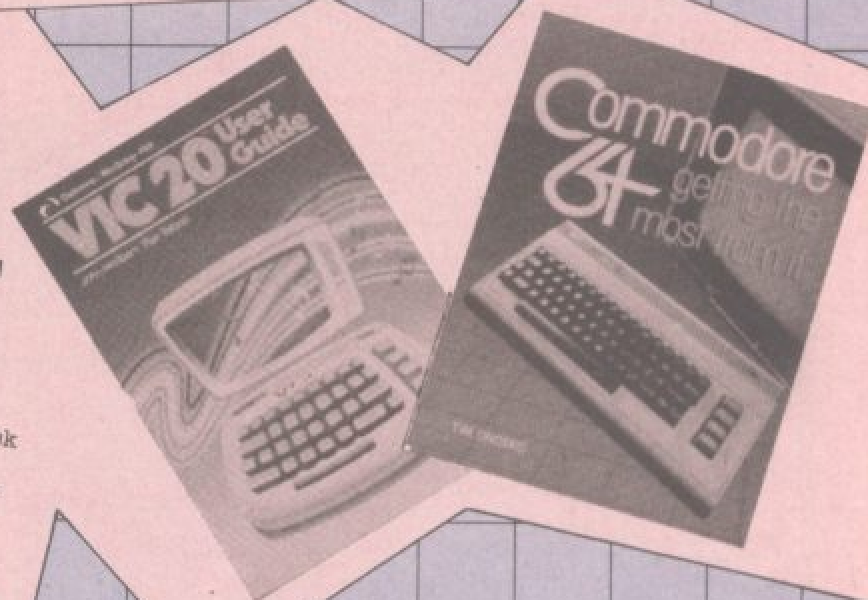
GET INSIDE THE 64

Commodore 64 — getting the most from it by Tim Onosko, published by Prentice-Hall.

Terrific value, especially at the price – 303 large-format paperback pages, a 'from the ground up' all-purpose manual/tutorial/reference for the 64 (genuinely the best we have found to date). Junk the Commodore-supplied user manual and get stuck into this: concise and sensible, clear presentation, well-written. Appendices include substantial contributions from Butterfield on the 64's memory and excellent exposés of sound and graphics.

If you want to have to use only one book to get on top of your 64, buy this one.

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Sticky keytops? Things falling past the keys into the computer? Don't take the chance. When you're not using your Vic or 64, slip over one of our tailored Commodore User dustcovers — smart black nylon, featuring the magazine's logo on top. They do keep out dust, but they'll also cope with coffee splashes (anything less than a thunderstorm in fact!), paperclips, cigarette ash, the residue of longhaired cats, and the general detritus of daily life. One size fits all.

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Vizawrite 64

by Chris Durham

Review

tab function, CTRL plus 'i' indents a paragraph.

The decimal tab is particularly good; the number moves to the left until the decimal point is typed, then extends to the right. This means that all the decimal points line up under the tab position. It may seem obvious, but many WP packages are much less obliging.

All the 'ruler' info – tab positions, print control codes, margins etc – are contained in a 'format line'. Most WP format lines like this have to appear at the top of a page; Vizawrite's can be placed anywhere in a document. It then affects the remainder of the document until another format line appears. Changing a tab position, for example, immediately changes the document; you can juggle your layout as you wish. You can even have different tabs for three lines and then revert to the original positions for the rest of the document.

New format lines are obtained by typing CTRL 'f'. A copy of the previous format line is then inserted where the cursor is and you can alter it as you wish.

The Function keys are also well used. F1 to f6 allow rapid movement through the document: f7 toggles the 'insert' mode, which continually opens up a large gap while you type new text then closes text up correctly when turned off. F8 duplicates the 'delete' function of CBM 'DEL'.

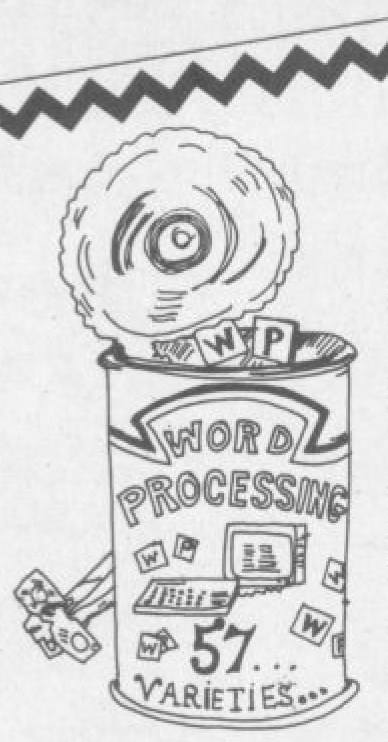
Output

Vizawrite has a full 'print page' menu, allowing you to choose exactly what you want to do with the text. You can chop and change easily, with the cursor moving straight to the next field using either RETURN or the cursor keys.

The first field is ingenious; typing the first letter of the name selects the printer type – and by typing either a capital or a lower-case letter you select which port the printer is connected to. Thus typing 'e' selects an Epson printer on the serial port, typing 'Q' selects a Qume printer connected to the User port.

Vizawrite contains its own Centronics parallel interface routine too, so parallel printers can be connected directly to the User port.

The 'Global/Fill' and 'File' fields are used to select files for merging text from or for linking into a single document. The range of pages can also be selected.



The great beauty of this system is the flexibility it offers; two printers could be connected at the same time allowing draft quality on one with an immediate letter-quality print on the other. Once set, the options remain on the 'print page' and are even saved with the document.

A useful feature is the ability to assign ASCII values to the CONTROL keys 0 to 9. Many printer features are selected by ASCII codes. By typing 'CTRL 1=27' on the format line, the ASCII code 'ESC' can be sent to the printer when you embed CTRL 1 in a document. All ten numeric keys can be assigned in this way, allowing almost any printer facilities to be used.

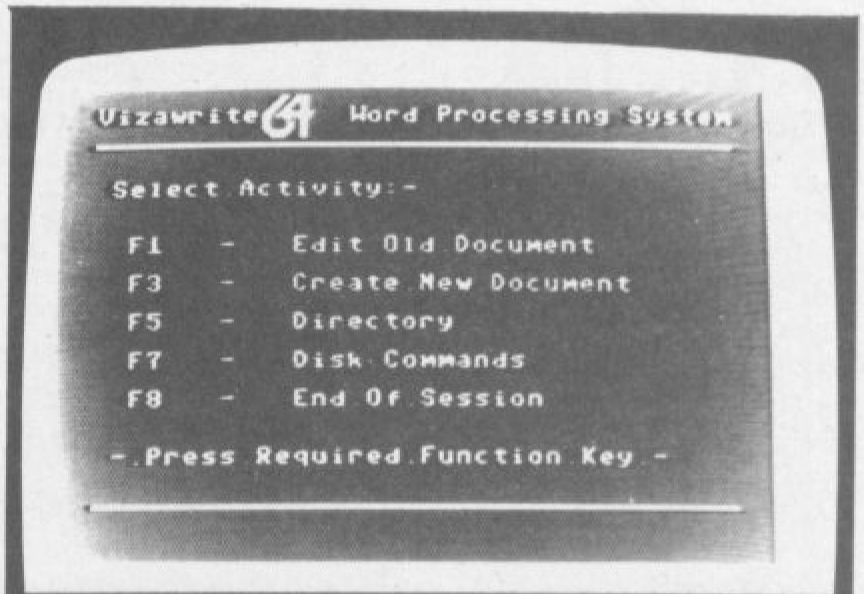
Other facilities

Vizawrite also makes good use of the sound and colour facilities of the 64. F1, f3 and f5 are used to change the text, background and border colours respectively following a CBM 't' command (for tone). The colours you select are saved with the document.

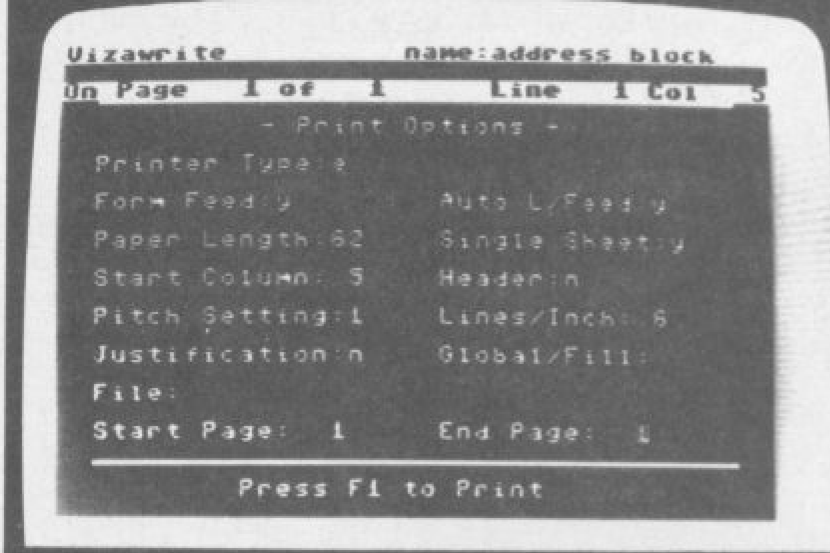
The 64's sound is used for warnings and errors. For example, if you try to quit the program (you probably guessed that's CBM 'q') and have made any changes to the document since the last time you saved it, you get a tone with a message on the bottom line reading "WARNING – CHANGES NOT SAVED".

In contrast to many WP packages, Vizawrite has separate pages for headers and footers so you can type as much as you like for these. Footers always appear, headers can be selected by an option on the 'print page'. Automatic page numbering is done by putting the page number symbol (CTRL#) anywhere on the footer page.

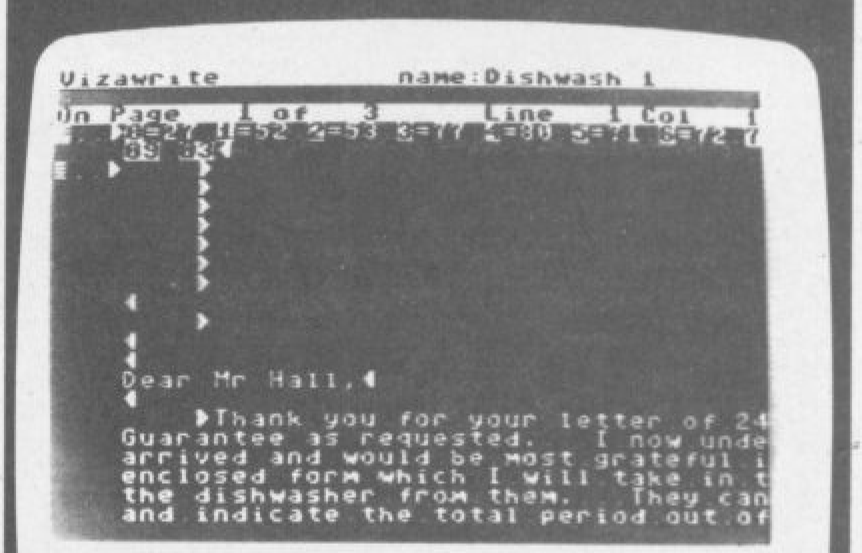
There is also a 'Work Page'; this allows you to store blocks of text, ideas, addresses or whatever and then incorporate them into your document or just



Vizawrite Initial Menu



Vizawrite 'Print Page' Menu



Vizawrite showing ASCII code assignments on format line, top of main text screen

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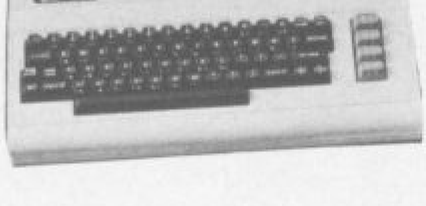
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VISA

refer back to them from time to time. Mail-merge information can be created or stored here instead of getting the data from a disk file. This is an extremely useful idea, not seen on many systems.

Actually splitting the document into pages must be done manually, using CTRL 'p'; some would argue that this is clumsy, but I found this very flexible – I tend to write a document as one page and then split it into logical chunks only when I've finally got it right.

Disk commands are fully implemented – you don't have to have the word processor to get at them. CBM 'd' allows standard disk commands to be used, CBM '$' reads the directory.

The manual

The user's handbook is a well printed and comprehensive 68-page book. The contents pages are fairly detailed – which is just as well as there's no index.

You do get summaries of the CONTROLs, COMMANDs and Function Keys, but they are embedded in the body of the manual making them difficult to find.

Although the manual is laid out logically enough, a beginner might have a little difficulty at first finding all the commands. The manual also tends to assume a certain prior knowledge which again may slow down the beginner. That said, Vizawrite is such an easy WP to work with that once the initial learning has been completed anyone should feel comfortably at home with both the manual and the system itself.

Limitations

There are on or two minor niggles about Vizawrite. Using the embedded ASCII codes takes up space on the line, for instance, and since these do not appear on the paper the line ends up shorter than it should when printed. This can be overcome by specifying format lines with wider margins for these lines, but it's a bit messy.

Second, the 'Save' option is both a Save and a Replace command. If a document name does not exist as a file it will create it, if it does it overwrites it. This can have its dangers – especially if you keep a file containing a common format line, colour settings etc and then load that in before writing each document. If you are not careful to rename the document immediately, you can save it to the wrong file by mistake.

I did discover one 'bug' which looked more serious than it was. On deleting a single character on page 3 of a document, the rest of the text (all eight pages!) disappeared to be replaced by a copy of the last three lines of page three!

After contemplating suicide I tried replacing the character I had deleted: and bingo! All my lost text reappeared. In fact adding any character anywhere on the page, even a space, will sort the problem. Viza Software has been told of the bug and I am assured current versions have been amended.

I would stress that this has occurred only once in the time I've been using Vizawrite: and apart from that I have found the system to be crashproof.

The printer handling is good. The one significant restriction here is that RS232 printers are not supported at all. While not quite as flexible as some – Paperclip, for instance – Vizawrite does cater for a reasonable range of printers (seven at the last count).

Conclusions

In case you haven't gathered, I liked Vizawrite immensely. It is the first WP package I have used that works in the same way I do. At £79.95 it sits about the middle of the price range of WPs for the 64 while giving an above-average ease of use with comprehensive facilities.

VIZAWRITE 64 ON BALANCE

FOR

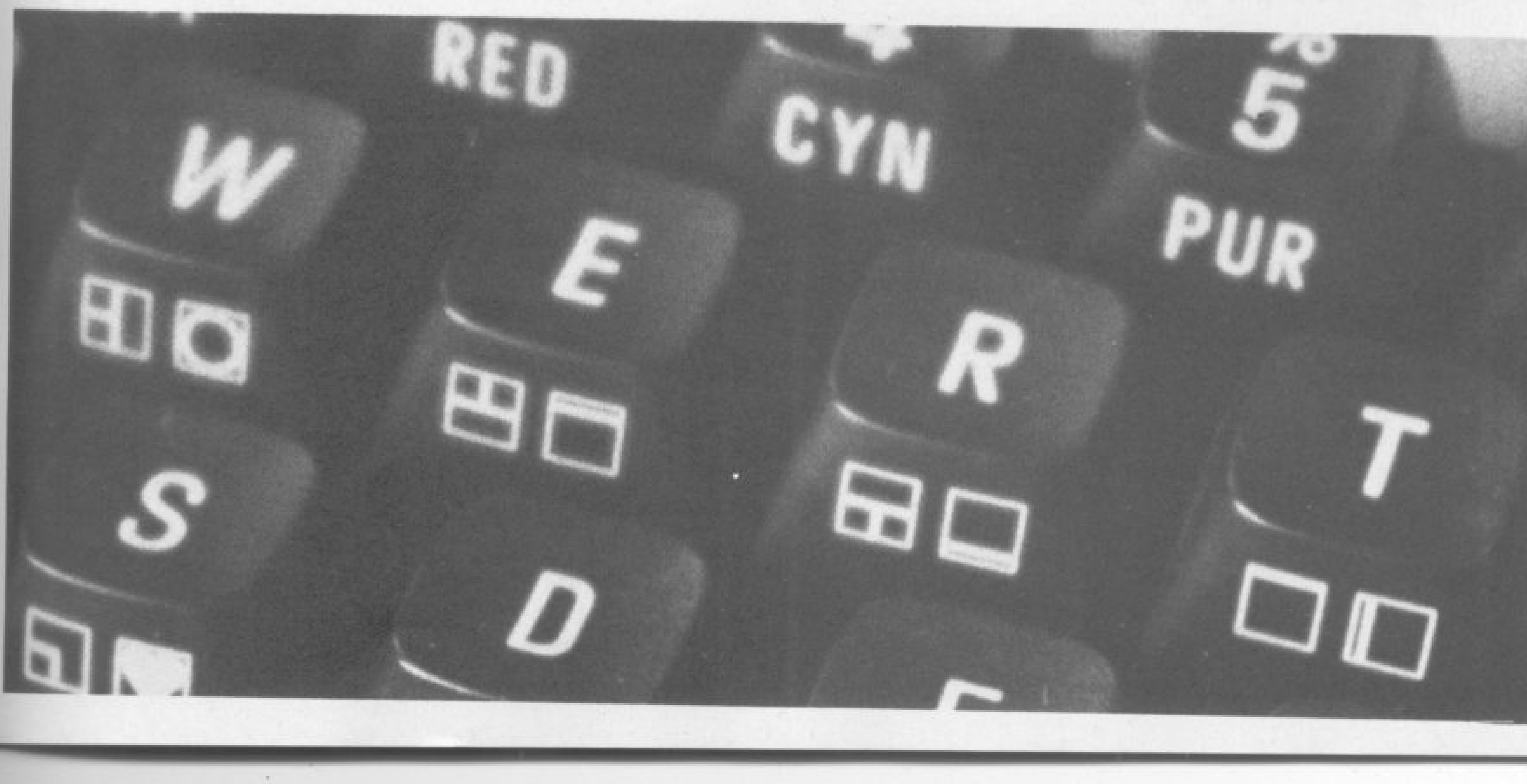
- Good range of easy-to-use editing facilities (especially block functions)
- Text formatted as you type
- Separate header and footer pages plus automatic page numbering
- Work page for storing text etc
- Comprehensive 'Print Page' menu
- Document assembly and mail-merge
- Full range of disk commands
- Good use of colour and sound

AGAINST

- No RS232 printers
- Assumes only one disk drive
- Limited sort functions
- Care required on SAVE

If you don't need alphabetic and column sorting facilities then this would be a good one to go for. For starters I'd recommend the cartridge version; this is virtually the same price as the disk version and is instantly available as soon as you switch on the computer.

Under review:	Vizawrite 64
Description	IEEE/RS232 adapter for Vic or 64
Supplier	Viza Software 9 Mansion Row, Brompton, Gillingham, Kent ME7 5SE 0634 813780
Summary	Middle-range price, above average facilities
Price:	£79.95



SOFTSEL®

HOT LIST™

Our own list of Commodore-related best-sellers reappears next month. But to keep the interest going, we've just received the latest 'hot list' from software distributor Softsel – which is probably the biggest distributor in the world, though its UK operation is still getting going.

Anyhow, we plucked these Commodore-relevant titles from the top 30 list of 'Recreation' best-sellers:

1 Zork 1 *very classy text adventure, available on the 64 though it probably owes its top-dog position and its 60 weeks in the chart to sales on the IBM PC and CP/M micros.*

3 Lode Runner *good arcade game, on Atari as well as 64.*

4 Choplifter *one of our faves and 61 weeks in the charts. Audiogenic sells it in the UK for Vic and 64.*

5 Frogger *Sierra On-Line's ok version of the squash-a-frog arcade game – 60 weeks in the charts! Available on the 64.*

6 Temple of Asphai *another 60-weeks presence, from Epyx. A good adventurish game.*

7 Jump Man *also from Epyx for the 64.*

8 Zork II *the follow-on Infocom adventure, another long-term seller (58 weeks). On the 64.*

9 Planetfall *one of Infocom's newer ones, and it's excellent – adventure in space. 64 and many other machines.*

10 Deadline *Infocom again – murder mystery adventure, 60 weeks in the charts and worth it. 64 and others.*

11 Ft Apocalypse *Synapse Software, Atari as well as 64. Haven't seen it but we've heard good reports of its graphics.*

15 Serpentine *like Choplifter, a Broderbund cartridge for the 64 and others sold in the UK by Audiogenic. Not our favourite game, but clever.*

17 Castle Wolfenstein *horror adventure by Muse for 64 and others. Pretty good ...*

18 Zork III *is there no holding them? 50 weeks in the chart for son of son of Zork.*

19 Sargon II *Hayden's world bestseller chessgame, from Commodore in the UK.*

20 Witness *yet another Infocom adventure for 64 and others. We haven't seen this one yet.*

22 Starcross *Infocom again, again we don't know it.*

23 Blue Max *from Synapse for Atari and 64. Definitely some of the best graphics you'll find in an air-ace game.*

24 Sea Fox *Broderbund's submarine warfare cartridge.*

28 Gridrunner *only 22 weeks in the chart for Llamasoft's pace-setting damn-near-impossible nerve-wracker?*

30 Shamus *another Synapse game for 64; don't know it.*

Softsel's other charts include one for Educational programs, which has Scarborough's US-orientated Master Type typing tutor at NO. 1 (Commodore 64 but also other machines). Star performer though is the British package Face Maker from ASK at No. 3 – 55 weeks in Softsel's charts.

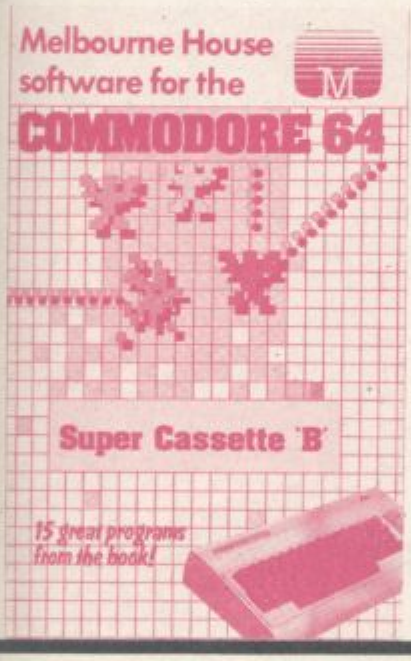
Three of Softsel's top ten books are Commodore 64 titles, with Osborne/McGraw Hill's *Your Commodore 64* number one with a bullet and the *Programmer's Reference Guide* elsewhere on the list with Dilithium's *How to use the 64*.

Screen scene for the 64

The 64 ought to be an excellent computer for games – and fortunately some suppliers are indeed taking advantage of that. Others aren't. Here's this month's crop of reviews.

How do we assess games? Basically we play them – which may sound obvious, except that all the reviewers have seen so many games that they can apply a bit of comparative experience to the evaluation.

We rate games out of five for each of four criteria. **Presentation** means how well the thing is packaged and how good it looks on the screen: dull graphics and poor sound get marked down here. **Skill level** refers to how much skill (of whatever kind) is required to play the game – so if pure chance is involved, the game gets a low mark. (But don't dismiss it on that: some 'chance' games are great fun.) **Interest** is an answer to how well the game did at maintaining the reviewer's interest in it. And **Value for Money** is obvious enough: it's our overall conclusion about how it compares with other games and whether we'd buy it ourselves.



SUPER CASSETTE 'A' & SUPER CASSETTE 'B'
CBM 64
Keyboard only
Price £6.95

These two cassettes from Melbourne House each contain 15 programs by Mark and Clifford Ramshaw: it sounds a bargain, but all the games are unsophisticated and of a similar standard to those you would type in from a magazine. They are all written primarily in Basic, with just the occasional machine-code routine; and as a consequence the movement is jerky. All the games are controlled from the keyboard with no joystick option.

The games on these cassettes may well represent a convenient package for younger children. But their simplicity and rudimentary graphics means they are unlikely to appeal to the serious games enthusiast.

The exception may be if you are interested in writing your own games . These can be modified and a book is available giving the listings and describing their operation. *WG/PR*

Melbourne House

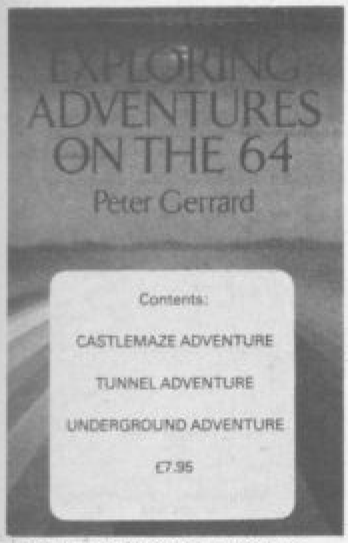
Presentation:	■■■□□
Skill level:	■■□□□
Interest:	■■□□□
Value for money:	■■■□□

EXPLORING ADVENTURES ON THE 64
CBM 64
Joystick or Keyboard
Price £7.95 (Cassette)
£6.95 (Book)

Exploring Adventures offers three complete adventure games on a single cassette and as such, offers good value for lovers of brain teasing adventure.

The games are *Castlemaze Adventure, Tunnel Adventure* and *Underground Adventure*. They all have a common theme involving exploration of tunnels and mazes; but the hazards met in each case are different. The


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Personal Computer News (15-21 Sept '83) gave SUPER SKRAMBLE! an overall rating of NINETEEN OUT OF TWENTY and described it as: "Well implemented with beautifully smooth scrolling and very nice graphics."
SUPER GRIDDER
"...a compelling piece of frivolity that could give hours of fun." was the verdict of Personal Computer News (22-28 Sept '83).
SUPER SKRAMBLE!
"An excellent game" said Computer & Video Games magazine (Sept '83).
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format is traditional, with no sound or graphics. *Underground Adventure* has a save-to-tape option which is sorely missed on the other two.

Two versions of the cassette are available, one for the CBM 64 and the other for the Vic-20. Both versions are the same and happily, so is the price. If you have a Vic though, you will need 16K expansion for the first two adventures; *Underground Adventure* requires a fully-expanded 32K machine which will limit it to a select group of Vic owners. Duckworth WG/PR

Presentation:	■■□□□
Skill level:	■■■□□
Interest:	■■■□□
Value for money:	■■■■■

SUPER DOGFIGHT
CBM 64
Joysticks or keyboard
Price £9.95

A game for two players in direct competition is quite a novelty, although we suspect it would soon wear off. There's no option in this game for one player competing with the computer.

The setting is a duel between two World War I biplanes. You can apply left or right rudder to steer your plane and the object is to shoot at your opponent; the computer records each time you score a hit and the game ends when one player achieves ten hits. It really is a very simple



game and there is nothing special about the graphics, although the sound effects are very realistic. The games can be played with two joysticks, or alternatively one joystick and the keyboard. The game would probably have been much better given an adjustable skill level for each player and also for the ability to accelerate or decelerate the planes. As it stands, the game becomes monotonous and would not hold the interest of an arcade game fanatic for long. WG/PR

Terminal Software

Presentation:	■■■□□
Skill level:	■■□□□
Interest:	■■□□□
Value for money:	■■□□□

ROAD TOAD
CBM 64
Joystick only
Price £8.95

Nothing new or original here – a carbon copy of *Frogger*. You are trying to cross a road first, dodging cars, lorries, the police, etc.; and you traverse a river by hopping between leaves, logs and turtles. You are awarded a bonus for every toad which returns home. After four toads have successfully returned, you



progress to the next skill level where life gets more hazardous.

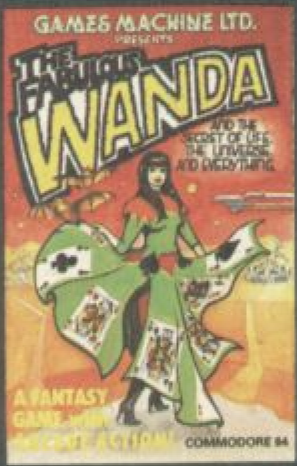
The game is a very good version of the original, with excellent sound, graphics and colour. The smooth movement and good joystick control make the game very playable. The main criticism is the price – at £8.95 one would have expected something a little more original. WG/PR

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Presentation:	■■■□□
Skill level:	■■■□□
Interest:	■■□□□
Value for money:	■■□□□

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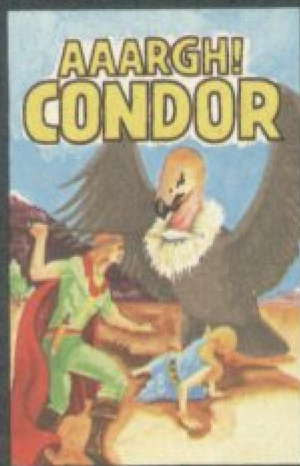
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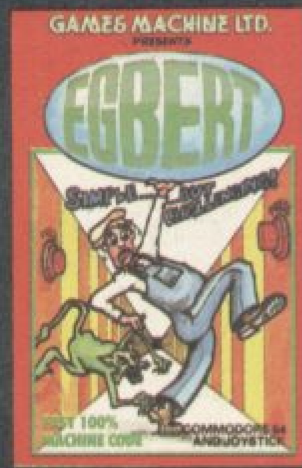
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George falls into a day-dream whilst sitting comfortably in his armchair smoking his pipe.

A scene floats in front of him of a landscape with trees and a mountain in the background. A damsel lies helpless having fallen down the mountainside. A strange vulture-like bird is flying down to seize the damsel and carry her off. The damsel is now becoming hysterical and frantic with fear - George knows what he has to do.

George at once becomes the hero but he has many hazards to overcome including deadly arrows from the local warrior, deadly creatures and eggs carefully aimed from the air. Can George make it to the top of the mountain to take the spear and kill the bird? *Will George finish the game before he drops his pipe and burns the house down?!*

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Commodore 64 Video:

A guided tour by Jim Butterfield

Part 3: Sprites



The story so far: we're touring the 6566 chip, which gives the Commodore 64 its video. We have noted that the chip goes to the memory for its video information, but can only reach 16K at a time; the computer controls which 16K bank via control lines in 56576 (Hex DD00). Then we looked through the functions of the non-sprite video control words at 53265 to 53286 (Hex D011 to D026). Now on to sprites ...

Sprites are completely separate from the conventional video circuitry. You can lay a sprite on top of just about anything. But first, what's a sprite and how do we define it?

Sprites are sometimes called Movable Object Blocks (MOBs); and that's what they are, movable objects. The nice thing about them is that they appear on the screen independently of the main screen image. So we can have a sprite airplane flying across the screen; and when it passes a background object, the object reappears as the plane passes by. This can save a lot of programming.

We noted in Part 1 that the video chip can reach only 16K for its information. This includes three things: the screen memory (or video matrix), the character generator (or character base) the same way, and the sprite information. It all has to come out of the same 16K section.

When we learn how to draw sprites, we'll discover that each sprite occupies 63 bytes and uses a 64-byte block. So within 16K we could draw up to 256 sprites. We can't *use* more than eight at a time, but we can have up to 256 drawings *waiting* to be used. The sprite positions number from 0 at address 0, through 1 at address 64, up to 255 at address 16320.

We cannot use all of the 128 sprite positions, of course. For one thing the video matrix and the character base will take up a total of 3K of memory, and this space won't be available to us. That cuts us down to 80; and depending on the 16K block we have chosen, there may be other forbidden locations.

The normal configuration is for the video chip to access 0 to 16383, and there's a *lot* of forbidden territory in there. Many of the first 1024 bytes are busy as a Basic work area; the screen is normally 1024 to 2023 (more on that later); the character base appears in addresses 4096 to 8191, since there are two complete character sets; and everything above 2048 that isn't used by the character base is used to store your Basic program.

We haven't started yet, but we seem to be out of sprite memory!



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Master

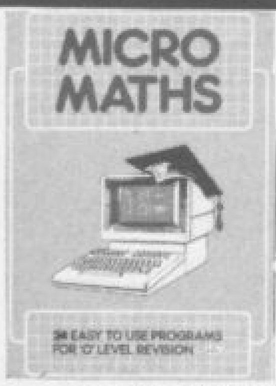
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If we want to draw lots of sprite pictures, we would need to do one of two things: move Basic RAM so that it starts at a much higher location. Or move to another 16K block that is not so busy.

For the moment, we can find room for a few sprites in the existing space. I find the following sprite areas available – sprite 11 at 704 to 766; sprite 13 at 832 to 894; sprite 14 at 896 to 958; and sprite 15 at 960 to 1022. These last three use the cassette tape buffer; if we use cassette tape during the program run, the sprites will become very strange ...

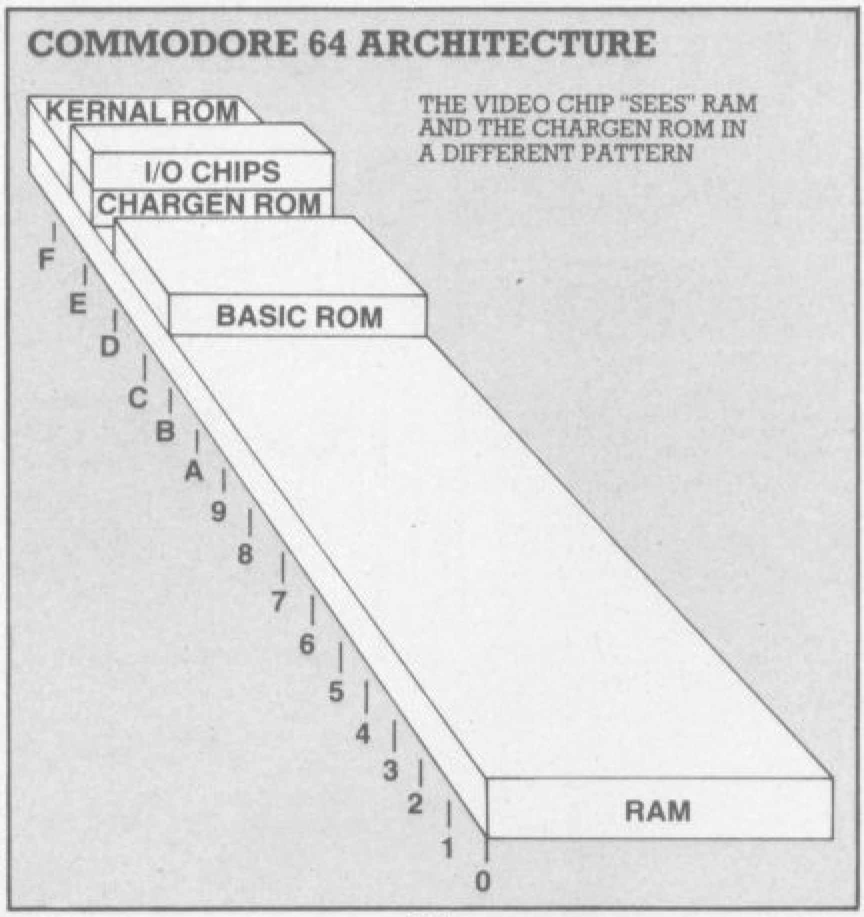
Drawing

There are quite a few utility programs around that will help us draw sprites. You should use them; they will help make life easier. In the meantime, we can draw a sprite the hard way by using a sheet of squared paper. Let's draw a target reticule. First, we'll sketch it:

```
xxxxxxxx••••••••xxxxxxxx
x••••••••••••••••••••••x
x••••••••••••••••••••••x
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xxxxxxxx••••••••xxxxxxxx
```

There are twenty-four pixels across (that takes three bytes of eight bits each), and twenty-one down. We may analyze the pixel pattern eight at a time, using a binary system to describe each byte. We end up with a data statement something like:

```
10 DATA 255,0,255,128,0,1,128,0,
   1,128,0,1,128,0,1,128,0,1,128,0,1
20 DATA 0,8,0,0,8,0,0,8,0,0,52,0,
   0,0,8,0,0,8,0,0,8,0
30 DATA 128,0,1,128,0,1,128,0,1,
   128,0,1,128,0,1,128,0,1,255,0,
   255
```



Now we 'place' the sprite into slot 13 by this:

```
40 FOR J=0 TO 62:READ X:
   POKE J+832,X:NEXT J
```

Good. Running the program this far will place the sprite into slot 13 ... but it won't do anything. It's just a picture, and nobody is using it. That's OK. In fact you'll often want to have dozens of pictures available even though you might end up using only one or two at a time.

Let's tell a sprite to use this drawing. We do it in an odd way: we don't use the video chip control registers at all. Instead, we use the video matrix, or 'screen memory'.

You may recall that 1024 addresses are set aside for the video memory, but the screen only holds 1,000 characters. What about the extra? At least some of them are used to designate which sprite picture to use for a given sprite. The last 'live' screen address is 2023. We could point sprite 0 to sprite drawing 13 (the one we have just done) by POKE 2040,13.

Better yet, let's point all the sprites at this drawing:

```
50 FOR J=0 TO 7:POKE 2040+J,
   13:NEXT J
```

We're almost ready to energize the sprite ... but first, let's give it a position by POKEing to 53248 and 53249. Let's put a value of 99 in each, and then turn the sprite on.

If you've run the above program, you may do this with a direct command. Or give it a program line:

```
60 POKE 53248,99:POKE 53249,
   99:POKE 53269,1
```

Either way, you should get our sprite on the screen. Now we can play with it, and see how easy some things are to do. Notice how you can see right through the transparent portions of the sprite to the program listing behind. You can try changing the sprite colour as desired by POKEing a value from 0 to 15 into location 53287. One colour will be the same as the background, so that the sprite will be almost invisible ... but not quite, since we can see it when it covers part of the text.

Moving

You can move the sprite around at will by changing the values you have POKEd into 53248 and 53249. Try playing with the values: you may find that you can move the sprite partly or completely off the screen. If you like, try the following command:

```
FOR J=99 TO 150:POKE 53248,J;
NEXT J
```

... and then substitute 53249 for 53248 and try it again. Neat? You bet. And there's more to come. But first, a small problem to be resolved.

We can move the sprite vertically anywhere we like – including partly or completely off the screen. But the screen is wider than it is high; and we can't reach the whole screen with the range of values (0 to 255) that we can POKE in 53248.

We need a high-bit to cover the extra distance. You'll find this in 53264; POKEing 53264 with a value of 1 causes sprite zero to be moved to the right – perhaps off screen.

Let's stop for a moment and look at video registers. When we set the X and Y position for sprite zero by changing 53248 and 53249, we recognized that we would need a different set of locations for sprite one – 53250 and 53251, as it happens. And when we set sprite zero's colour to any one of the sixteen combinations by changing address 53287, we see that we'll need a new colour address for sprite 1 – 53288.

But the other sprite registers use a different system. One register controls all sprites, so that address 53269 allows us to turn on one sprite or all eight. We use a bit map to arrange this. The pattern is:

Sprite 0 – value 1
Sprite 1 – value 2
Sprite 2 – value 4
Sprite 3 – value 8
Sprite 4 – value 16
Sprite 5 – value 32
Sprite 6 – value 64
Sprite 7 – value 128

We use addition to signal a combination of sprites. If we wished to turn on sprites zero and two, for instance, we would POKE 53269,9 (nine is the sum of eight and one). All other sprites would be turned off.

That's how the X-position high bit works: we set sprite zero to the right hand sector of the screen by POKE 53264,1. All the other registers we will discuss work the same way.

You may be pleased by the way that the sprite moves over the top of the text on the screen; it would move over a background picture just as easily, of course. But we have another option – you can make the sprite move *behind* the main screen if you wish. Do this with location 53275. For example, POKE 53275,1 will place the sprite behind the screen text.

CODEWRITER FOR THE COMMODORE 64

Instant programming? By Neville Ash

One of the things people soon find out about home computers is that to go any further than playing games they must learn a programming language. But why do you need to learn a special language? Why can't the computer understand your *own* language, English?

And having learnt Basic or whatever, it soon becomes clear that proficiency can be very elusive. How to write elegant, efficient programs? How to make the programs do complex things, like run business applications with 'help' displays, data entry screens, files and file updates, selective reports?



It was these questions that Tony Thorne of Dynatech asked, and they led to a whole company springing up to manufacture programs that write programs for you. Neville Ash reviews Codewriter for the 64.

About the same time DJ Al Systems produced a program called The Last One, probably the most publicised software for microcomputers in history: and it too is a code generator.

From November 1982 when the first version of Codewriter appeared (at the Comdex show in Las Vegas) the program has been developed to work on an increasing number of micros. And when it was launched for the Commodore 64 earlier this year it became the first generating system to be available for a microcomputer costing under £300.

While it is certain to be followed by other manufacturers, why has it taken so long for a code-generating system to be available for the lower-priced machines?

Two main reasons have probably caused this delay. Most of the budget-price micros use cassettes with all the limitations this places on the software developer: and the memory available was always limited, when program generators inevitably need a lot of RAM.

With the Commodore 64 we had a computer with 64K – fully 50 per cent more than the Spectrum and Oric, twice the capacity of the Dragon. The Commodore 64 also scored with its proven disk drive system. And now it's below £200, the price is really attractive.

So maybe the first-time user who wants to write a program without learning a language has the chance to catch up. The best way to describe Codewriter is to explain what the program really does, cutting through all the publicity.

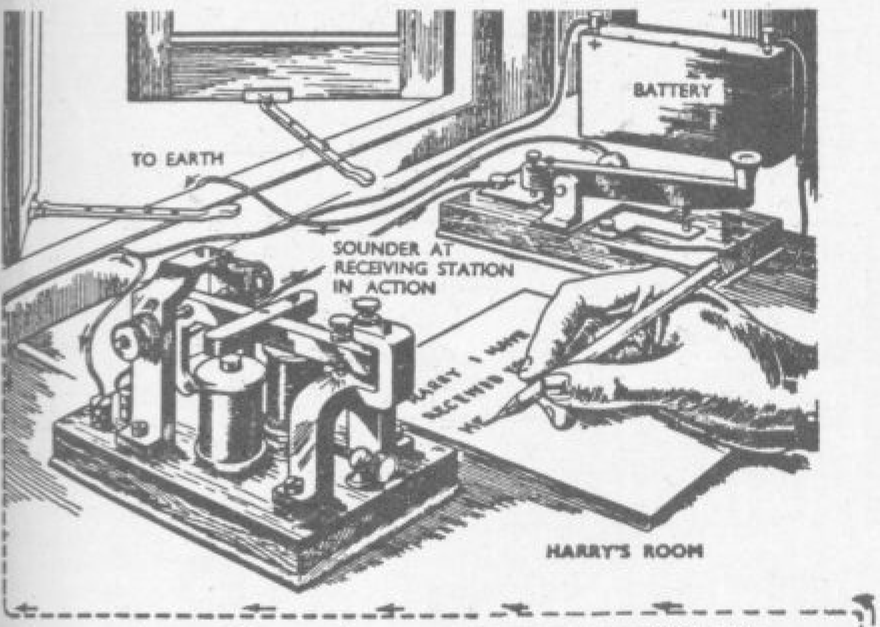
Programs that write programs

The key to what is done by the program Codewriter is right in front of you. This package creates the computer code – hence the name Codewriter – from the answers to questions the program puts to you and the information you enter: as your own program is created this software turns all the information that has been typed in at the keyboard into lines of Basic.

So to be perfectly accurate, the user writes the program: and the software just creates the code. In fact the term 'program generator' has resulted in so much bad publicity (you still have to do quite a lot of work) that Dynatech now uses the slightly more down-to-earth phrase "the plain-language program design system" to describe Codewriter.

The package containing Codewriter itself is made from moulded plastic and would look equally happy on a bookshelf. Inside are five items: two floppy disks, two manuals and a dongle.

Codewriter is only available in disk form; Commodore 64 users with cassette recorders will have to fork out £200 for a disk drive to take advantage of this program. Why only on disk? Because to use tape would have produced technical limitations and the end-user wouldn't have been satisfied by the difficulties of using it. And a disk system opens the door to far more flexibility with the



software, anyhow, and it expands the possibilities for the 64 user.

The dongle (Dynatech calls it a 'protection key') is a security device to stop you ripping off copies of the program. It is inserted into the cassette port with the Dynatech label on top. If this dongle isn't fitted, the software won't work: it's as simple as that. (A program created with Codewriter doesn't need a dongle to make it work, however.)

The first disk is used to create the screen for the information you enter and the software to go with it, the second one handles the reports and menus. For back-up disks the user sends the guarantee registration form back to Dynatech; this also entitles you to one years free subscription to Dynatech's *Insight* newsletter, which could become a good thing (with hints and tips) but which at present is mostly PR blurb.

The two manuals supplied are to some degree complementary, with the main one handling most of the information and instructions. The second thinner volume covers the menu operation in detail and discusses a few refinements that have been done to the Codewriter program.

Codewriter in use

The first part of creating a computer program using Codewriter starts with the data entry system. This effectively determines the way you want information laid out on the screen.

After loading the first disk into the drive, the shift key and Commodore shift key are pressed – this starts the upper/lower case mode operating for Codewriter. Now type LOAD "NEWMENU",8 and the program will load. Don't make the same mistake I did and make 'newmenu' two words – if you do, the program won't load! Follow the instructions and there's no problem.

Once the program is loaded, READY will appear on the screen and you can type RUN. This brings up the main menu of the Codewriter.

There are three options in it:

- create a data entry system
- format a disk
- exit to basic

The first step is to format the disk which will be used to store the program created by Codewriter. (As formatting a disk clears any data or program from the disk when **F** for format is pressed, a warning appears to give you the option of changing your mind.) The Codewriter disk is removed from the drive and a blank disk inserted. Then **Y** (for yes, go ahead and format) is typed.

Now the first step in creating a program can be taken – the data entry. Taking the first option in the main menu brings up the Create Data Entry System menu. Here the options are:

- create screen layout
- create an application
- exit to basic

Every program starts with the screen layout and goes from there. Selecting this will display its own five option menu and the first one – Edit or Create a Screen is taken. This allows you to set up a form on which data can be entered when your program is run.

Press **E** for Edit or Create, and a mass of instructions appear on the screen. The amount of detail appears confusing at first, but the manual covers it quite well.

Although the image on the screen is 40 x 22 lines, column 40 cannot be used as part of the screen design.

In fact being able to follow the screen instructions on keys which allow you to move around the screen, was far better than the average manual trying to explain the same thing.

Once this screen is complete, there is a choice of either viewing the complete screen or producing a hard copy version via a printer.

The first thing this screen needs is a *label* or title, simply a description of the display. After the label the *headings* are typed in, followed by a number of dots corresponding to the amount of space in characters that you're leaving for each item of data to be entered there. Up to 38 characters can be used on the 40-column Commodore 64.

Then there is the *date* option, which can in the format day/month/year (English-European) or month/day/year (American). The information for the headings – fields – can be divided into four distinct categories: (*letters* and numbers used as text,) *numbers* used as numbers, fields which are the *products of calculations*, and *money* fields (for decimal-type currencies).

Finalising the screen

Once you are satisfied with the layout of the screen, the different types of data can be indicated to Codewriter. For a field that must be entered from the keyboard 'K' is typed: one which is calculated from other fields is coded 'P': and totals are marked 'G'.

After this has been done you return to the screen format generator menu. At this stage there is the option of altering the format – using the Edit facility, or just by moving the existing information around with the Change option.

When the screen has been adjusted to meet the needs of the user, S is pressed to save it to disk. But if you choose the Exit option before saving the screen, it will be lost: so you have been warned!

Creating the code

At this stage you return to the main menu and press A for create an application. Then enter a name – up to 25 letters – followed by the name of the program designer and one for the screen file.

The next stage

Now Codewriter will go through the different types of field that are going to be grand total fields, computed ones, and 'self-referencing' ones. This information is completed according to the design of the screen, and you're asked for the maximum number of records you want in the data file. This depends purely on the amount of detail in the screen that has been created. On average between 800-900 records can be stored per disk.

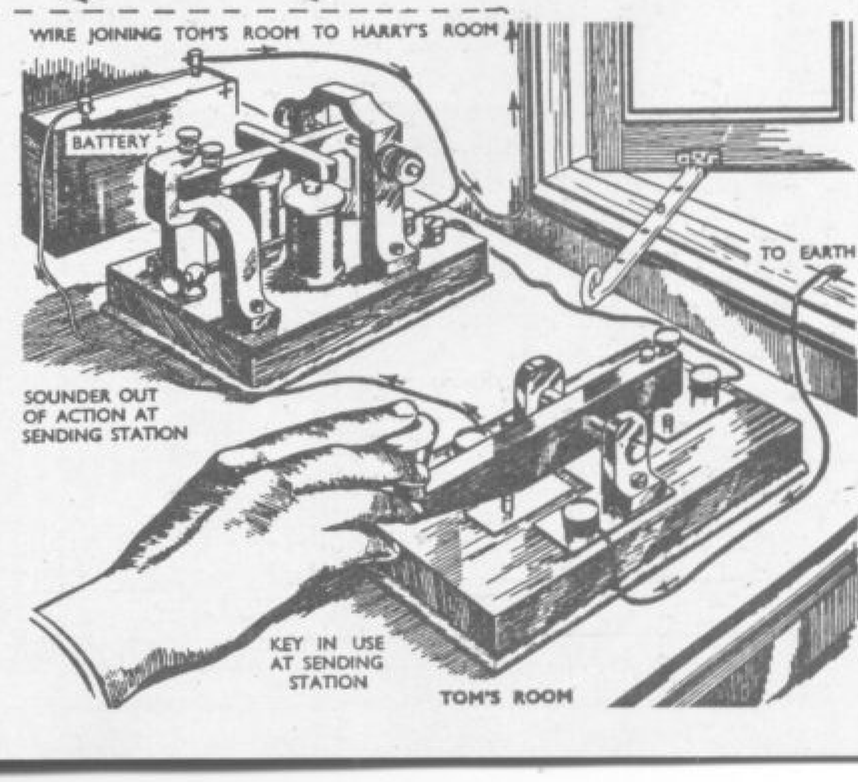
The key fields are then designated; they can only be fields that are entered from the keyboard.

To clean up the program error trapping is provided. So if an incorrect entry is made a suitable message appears on the screen – especially important when the end-user is not the person who wrote the program. There is a range of options in this section covering most possibilities.

Once this stage has been reached the program creation option is taken and the whole program converted into Basic. In case there is any doubt, a message appears on the screen telling you to remove the Codewriter disk and to insert the formatted disk ready to receive the program.

At this stage the file preparation utility is used to prepare the disk designated to hold the data from the program. For a simple program, that's that. For more sophisticated applications there are extra facilities to look-up records, search, delete, verify and exit. And for extra complexity you also have options for general tests, data size tests, number and character tests.

In fact the level of sophistication is left to the



64 hardware

HARDWARE

These prices include VAT and carriage! If software is ordered at the same time a further discount on hardware of 1% is offered for each £15 software bought (limit is 5% extra discount). For example, ordering £75 or more of software at the same time as special package (i) reduces its price by £11.50 to £218.50. Now beat that!

Product	OUR PRICE	Product	OUR PRICE	Product	OUR PRICE
(a) Commodore 64	£195	(e) 1526 printer	£310	(i) package (a) + (b)	£230
(b) 1530 cassette unit	£ 40	(f) Epson FX80	£400	(j) package (a) + (c)	£387
(c) 1541 disk unit plus Easyscript, games	£199	(g) parallel printer cable – software	£ 25	(k) Interface to convert any cassette recorder for 64 use – it's excellent!	£ 25
(d) MS801 printer	£199	(h) 1520 print/plotter	£160		

ACCESS/VISA credit card hot-line:

(0227) 266289

If answering machine in use be prepared to state program name, your credit card number and expiry date, your address and telephone number.

software selection

SOFTWARE SELECTION

This is a selection of some of the best programs for the Commodore 64 from a list of over 800 we can supply, covering the products of 100+ software houses from the UK, rest of Europe, and the USA. A 20-page listing and later updates are available free to customers (otherwise 50p and large SAE, credited against first order). Add 50p p&p for orders under £20.

Please note that the prefix (d) before a price denotes that the program is available on disk (for example d25). The prefix (r) (as in r29) indicates that the program is in cartridge form and costs £29.00. Tape program prices have no prefix. Thus (d29 16) indicates a disk version at £29.00 and a tape version at £16.00.

WORD PROCESSING

PAPERCLIP (d90) is the most sophisticated and versatile wp program for the 64. Very good too is **VIZAWRITE** (r68 d65) which is a spell-check program **VIZASPELL** (d20 if bought with VIZAWRITE, else d65). But for casual wordprocessing of extreme sophistication we recommend **HOMEWORD** (d35) which is outstanding value and very easy to master. It uses 'icons' to symbolize menu options (as used by Lisa). Contains several really innovative features. Much further down the scale but ideal as a low cost text editor is **WORD WIZARD** (5.99). Compatible labelling programs are available.

UTILITIES

BACKUP & FILECONE (15) are two programs for duplicating valuable tape programs – the first being capable of copying almost all protected programs. Tape-to-disk and disk-to-disk versions of this truly useful program will be available soon. **1541 BACKUP** (d13 11) duplicates disk-based program material which is unprotected. **DISKEY** (d36) is a really powerful disk editor. **PROGRAMMER'S UTILITIES** (d14.99) surely represents the best value if you have a disk: sprite, character, and sound editors are provided in addition to a PET emulator, and disk copy utilities – a dozen in all! **COMPACTOR** (d10.50 8.50) cuts out all wasteful programming including REMs and spaces. This can speed up programs and salvage memory. Various good quality sprite and character editors are available including **SUPERFONT 4.0** (6.75) **SPRITE/GRAPHICS EDITOR** (5.99) **SPRITEMAKER 64** (6.75). On the music side **MUSIC COMPOSER** (r9.99) **ULTISYNTH** (14.95) and **SYNTHESOUND** (r25 d25).

PROGRAMMING AIDS

These range from improvements to C64 BASIC to actual programming aids. **SIMONS BASIC** (r50) adds 114 extra commands and facilities, and the rather better planned program **BC BASIC** (r50 17.95) does much the same. Best of the compilers and excellent value is **PETSPEED** (d50). **POWER 64** (d72) is a most useful programming tool with many easily learnt features. On the machine code front there are numerous monitors and assemblers the best of which is **MIKRO ASSEMBLER** (r53) but **MONITOR** (r29.95) **ASSEMBLER 64** (6.75) **ASSEMBLER DEVELOPMENT** (d24.95) **HESMON 64** (r29) **MASTERCODE ASSEMBLER** (14.95) and **PAL 64** (d72) – a suite of programs – can all be recommended. If you want to learn about machine code programming we suggest **ASSEMBLER TUTOR** (d29.95 29.95) or Honeyfold's **BEGINNER'S ASSEMBLY LANGUAGE PROGRAMMING** (14.95)

DATAFILES/DATABASES

Unquestionably the one program to have if you can afford it is **SUPERBASE 64** (d88) which we have on special offer by way of encouragement! This is a sophisticated programmable relational database. Think of what you would like your database program to do – and SUPERBASE will probably be able to do it! Very, very powerful and very, very versatile. **INFODISK** (d73) and **DELPHI'S ORACLE** (d 90) are very similar and offer larger individual records but more restricted programming constraints. Multifunction database/wordprocessors include **MAGPIE 64** (r95) **INFOMAST** (d90) and **VIZASTAR** (d99). All these programs are capable of serious disk-orientated business applications. **DIARY 64** (r43) is a really excellent 'single page' datafile for tape or disk records.

FINANCE/SPREADSHEETS

CALCRESULT (d110) is a very sophisticated 3D spreadsheet we highly recommend for serious business uses. **PRACTICALC** (d40 35) is very good value. Also: **FUTURE FINANCE** (d75) and **BUSICALC 2** (d79 77). For home accounts there's **BANK MANAGER** (d10 7.50) **HOUSEHOLD FINANCE** (21) **MONEY MANAGER** (9.99) **HOME ACCOUNTANT** (d52.50) **TIME & MONEY MANAGER** (d49). Business account programs are available also. These usually form part of a suite of related business programs. For a low cost example **BUSCOM–1, BUSCOM–2, BUSCOM–3** and **BUSCOM–4** are for monthly accounts, wages, retail accounts, and stock system respectively (all d21 19 – demonstration versions at d4.50 2.50 each).

RECREATIONAL

We can supply any of the popular games from established software houses and this includes an unbeatable selection of imported material. If there's a program for the 64 ... we can usually provide it! Look out for **ALICE IN WONDERLAND** (d27) and the definitive C64 **FLIGHT SIMULATOR II** (d35). Really good imports include **BLUE MAX** (d29 29) **PROTECTOR II** (d25 25) **FORT APOCALYPSE** (d23 23) **PITSTOP** (r27.50) **JUMPMAN** (d27.50 27.50) and **JUMPMAN JUNIOR** (r27.50) ... but there are many others! Interested in adventuring? Highly recommended are the following: **COLOSSAL ADVENTURE, ADVENTURE QUEST, DUNGEON ADVENTURE, SNOWBALL, TIME LORDS,** and **TWIN KINGDOM VALLEY** (all 9.50) **THE HOBBIT** (14.50), plus Infocom's **ZORK I/II/III, STARCROSS** (all d29), **WITNESS, DEADLINE, SUSPENDED, ENCHANTER, INFIDEL, PLANETFALL** (all d36).

Our list includes details of EDUCATIONAL, ACCOUNTING, BUSINESS and GAMES programs not possible to itemize here. PLEASE TRY US IF YOU ARE HAVING DIFFICULTY LOCATING A PROGRAM. Please make cheques/PO's payable to the Six-Four Supplies Company.

the six~four supplies company

P.O. Box 19, Whitstable, Kent CT5 1TJ. Incorporated by The DGH Software Centre, Ashford, Kent (a division of T. Denne & Sons Ltd)

operator of Codewriter – it can be as simple or as complex as you like.

Reports

Starting the second stage, insert the Codewriter disk two and load "sc5",8. After the program has loaded you remove the disk and replace it with your applications disk.

Now you type save "@:sc",8 and press return, remove the application disk and replace it with Codewriter two again to load 'sort',8. Once *that* program has been loaded, you once again switch disks and save "@:sort",8. This procedure transfers two programs from the Codewriter report systems disk on to your own user programs disk.

And now just about all possible types of reports can be created, even with an 80-column display (which can be viewed one half at a time on the 40-column screen of the Commodore 64). The options are numerous: suffice to say that almost any permutation required canbe done. So if just part of the data needs to be printed in a certain way with a range of selection techniques, these can be specified and the report printed.

And at the end of this section, this part of the program is also saved to disk.

The final stage, also involving program transfers from the second Codewriter disk, is the menu creation system. This can be used to create the single menu for a simple program, or a whole range of menus for a suite of software created with Codewriter.

Conclusions

Codewriter is the first of the program-generating systems to become available for the Commodore 64: doubtless there will be more.

The program isn't the most versatile of all the contenders, but it is among the easiest to use. And for the first-time user ease of use legitimately takes precedence over sophistication. Importantly, because it is menu-driven there are no separate commands other than those appearing on the screen.

And as it appears to be so easy to use, bear in mind what *can't* be done. For a start Codewriter is not for the games fiend – no *Missile Command* or *Frogger* from this package: for them you'll need machine code. But for people who want to produce a program to a particular application, it will prove extremely suitable. It will not replace a word processing package or even a spreadsheet: Far better to buy these programs off the shelf. It will however do virtually anything else that involves setting up files and using them.

One of the most important advantages is time saving – a program can be created in an overall time of about an hour or so and this program won't have the debugging problems suffered with conventional programs written in standard languages. For people who feel Basic is a slow language – the program created with Codewriter can be compiled, but few users have commented about the slowness in operation.

The manual is short and good with drawings of the keyboard and screen throughout. However so much information appears on the screen that it is almost possible to work without it.

CODEWRITER ON BALANCE

FOR

- Makes writing programs very simple
- Can almost manage without a manual
- Manual simple to understand
- Write a program in around an hour if not less

AGAINST

- Limited to the 40 columns of the Commodore 64 for screen viewing
- Can only create a single large file
- Unsuitable for games
- Only available on disk

Under review:	Codewriter 64
Supplier:	Dynatech Microsoftware Rue du Commerce Bouet St. Peter Port Guernsey Channel Islands 0481-20155/26081
Price:	£85.00

Sprite Editor

by David Elliott

This is undoubtedly one of the best sprite editors we've seen. It's bulky – but it works, and very well too.

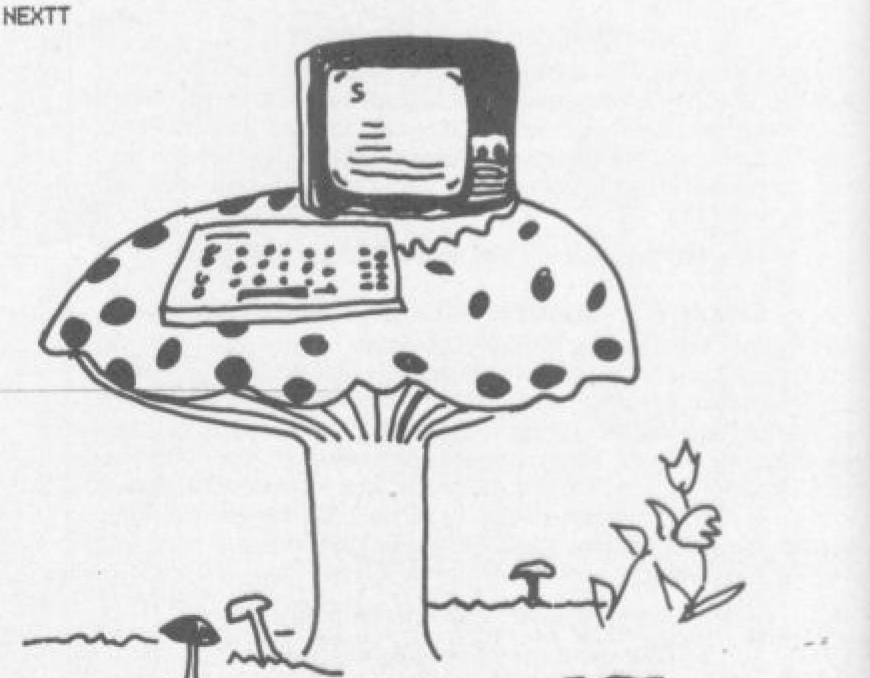
One of its more appealling aspects is the built-in documentation. Not only is the opening display a summary of the commands and facilities in the program, there's also an option to print out on a Commodore printer for use as a ready-reference guide. For those without a printer, here is the summary:

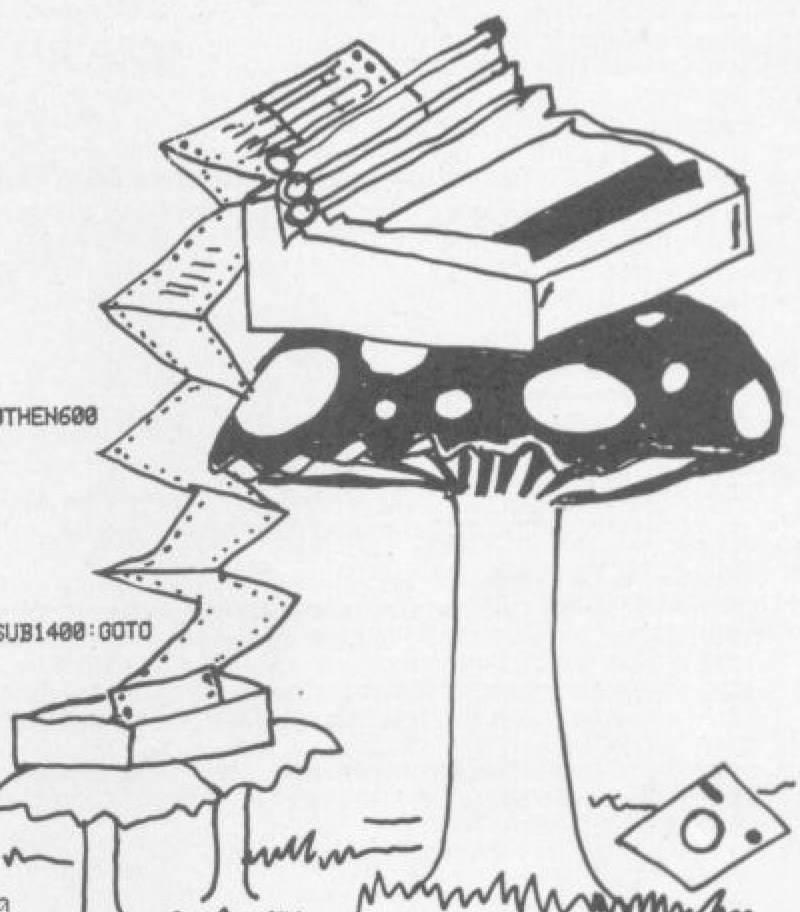
Keys pressed	function
Nos. 1 - 8	select sprite
I,J,K,M,	control cursor
9	fill / erase dot
ctrl + C	clears sprite
ctrl + R	reverses sprite
ctrl + A	Australian sprite
ctrl + I	imitate other sprite
X / Y	expand in X / Y
shift + M	view multicolour gird
S	select screen colour
F1	puts multicolour on/off
F3	select sprite colour
F5	select mu!ticolours 1,2
V	enter sprite data
cbm + S	save sprite (disk)
cmb + L	load sprite (disk)
cmb + E	erase sprite (disk)
shift + S/L	save/load sprite (tape)



```
*** SPRITE EDITOR ***

10 REM    ***********************
20 REM ****                  ****
30 REM ****   COMMODORE 64   ****
40 REM ****  SPRITE  EDITOR  ****
50 REM **** REVISED  VERSION ****
60 REM ****  FOR NORMAL AND  ****
70 REM ****   MULTICOLOUR    ****
80 REM ****     SPRITES      ****
90 REM ****                  ****
91 REM **** (C) DAVID ELLIOTT ****
92 REM ****     20/7/83      ****
100 REM ****                 ****
110 REM   **********************
120 S=53281:V=53248:DIMSD(7):FORT=0TO7:SD(T)=12288+64*T:NEXTT
130 POKES,6:POKES-1,6:POKEV+21,255:FORT=0TO7:POKE2040+T,192+T:NEXTT
140 PRINT"   -OMMODORE 64 *PRITE -DITOR (_EVISED)";CHR$(14)
150 PRINT"  ________________________________________"
160 PRINT"/EYS PRESSED - FUNCTION"
170 PRINT"/OS. 1 - 8        SELECT SPRITE"
180 PRINT"\,\,/,\           CONTROL CURSOR"
185 PRINT"9                 FILL / ERASE DOT"
190 PRINT"CTRL + -          CLEARS SPRITE"
200 PRINT"CTRL + _          REVERSES SPRITE"
210 PRINT"CTRL + *          *USTRALIAN SPRITE"
215 PRINT"CTRL + \          IMITATE OTHER SPRITE"
220 PRINT"* / |             EXPAND IN * / |"
225 PRINT"SHIFT + \         VIEW MULTICOLOUR GRID"
230 PRINT"*                 SELECT SCREEN COLOUR"
240 PRINT"_1                PUTS MULTICOLOUR ON/OFF"
250 PRINT"_3                SELECT SPRITE COLOUR"
260 PRINT"_5                SELECT MULTICOLOURS 1,2"
270 PRINT"x                 ENTER SPRITE DATA"
280 PRINT"CBM + *           SAVE SPRITE (DISK)   "
290 PRINT"CBM + L           LOAD SPRITE (DISK)"
295 PRINT"CBM + -           ERASE SPRITE (DISK) "
296 PRINT"SHIFT + */L       SAVE/LOAD SPRITE (TAPE)"
300 IFPR=0THENPRINT"     LEASE WAIT A SHORT WHILE "
310 IFPR=0THENPOKE198,0:GOSUB1450:GOTO320
315 PRINT#5:CLOSE5:PR=0:GOTO400
320 GETA$:IFA$=""THEN320
330 PRINT"OULD YOU LIKE A PRINT-OUT OF THE KEYS"
331 PRINT"AND THEIR FUNCTIONS (IF YOU HAVE THE"
332 PRINT"xIC-1515) ? ANSWER | / /"
333 GETA$:IFA$=""THEN333
340 IFA$="N"THEN400
345 IFA$<>"Y"THEN333
```



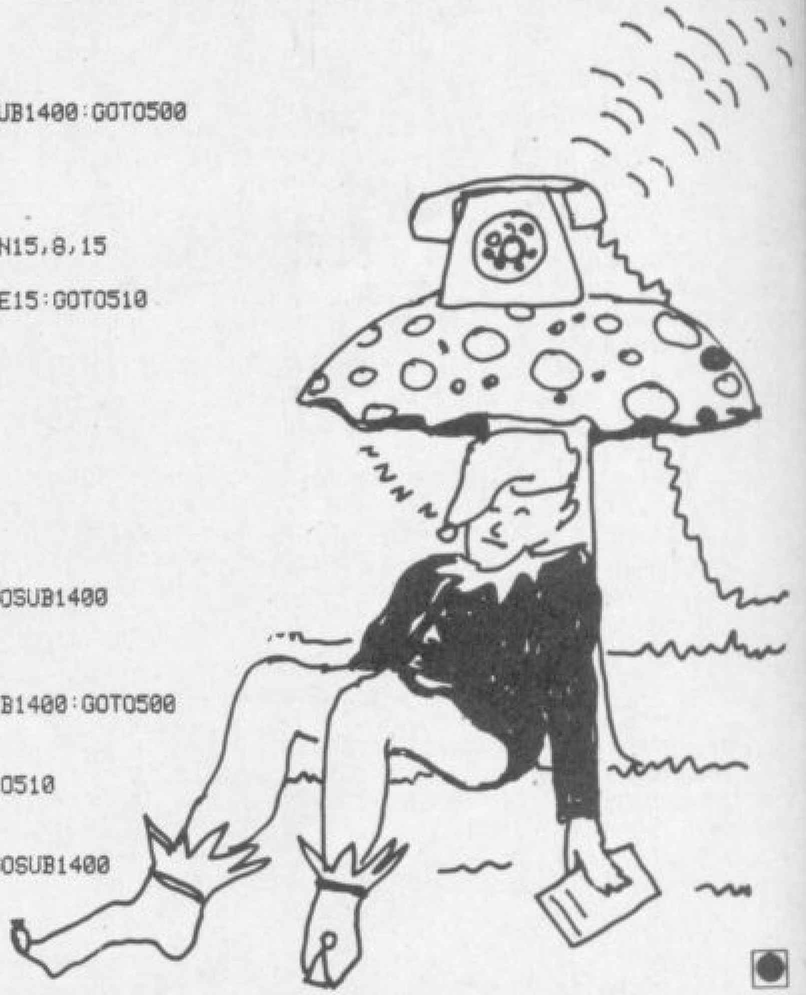


```
350 PR=1:OPEN5,4:CMD5:PRINTCHR$(14)CHR$(17);:GOTO160
400 PRINT"▒┌┬┬┬┬┬┬┬┬┬┬┬┬┬┬┬┬┬┬┬┬┬┬┬┐"
410 FORT=1TO21:PRINT"├                        ┤":NEXTT
430 PRINT"└┴┴┴┴┴┴┴┴┴┴┴┴┴┴┴┴┴┴┴┴┴┴┴┘"
440 SN=0:X=1:Y=1:GOSUB1400
450 POKEV+16,1:POKEV,0:POKEV+1,50
499 REM ****** MAIN LOOP ******
500 Q=PEEK(1024+X+Y*40)
510 POKE198,0:POKE1024+X+Y*40,3:FORT=1TO20:IFPEEK(197)<>64THEN550
520 NEXTT:POKE1024+X+Y*40,Q
530 FORT=1TO20:IFPEEK(197)<>64THEN550
540 NEXTT:GOTO510
550 P=PEEK(197):PM=PEEK(653):IF(P<>33ANDP<>34ANDP<>36ANDP<>37)ORPM<>0THEN600
560 IFP=33ANDY>1THENPOKE1024+X+Y*40,Q:Y=Y-1:GOTO500
570 IFP=34ANDX>1THENPOKE1024+X+Y*40,Q:X=X-1:GOTO500
580 IFP=36ANDY<21THENPOKE1024+X+Y*40,Q:Y=Y+1:GOTO500
590 IFP=37ANDX<24THENPOKE1024+X+Y*40,Q:X=X+1:GOTO500
595 GOTO510
600 IFP=64THEN510
610 ONPMGOTO700,800,510,900,510,510,510
620 GETA$:IFVAL(A$)>0ANDVAL(A$)<9THENSN=VAL(A$)-1:POKE2040,192+SN:GOSUB1400:GOTO
510
630 IFP=32THENQ=32-(128*(Q=32)):GOTO510
640 IFP=23THENPOKEV+29,-(PEEK(V+29)=0):GOTO510
650 IFP=25THENPOKEV+23,-(PEEK(V+23)=0):GOTO510
660 IFP=13THEN1200
670 IFP=31THEN1250
671 IFP=4THENPOKEV+28,-(PEEK(V+28)=0):GOTO510
675 IFP=5THEN1500
676 IFP=6THEN1550
680 GOTO510
700 IFP=36THEN1300
790 GOTO510
800 IFP=13THEN1600
810 IFP=42THEN1650
820 IFP=14THEN1750
890 GOTO510
900 IFP=20THEN1800
910 IFP=17THEN1850
920 IFP=10THEN1900
930 IFP=33THEN1950
999 GOTO510
1000 REM ******************************
1010 REM *   INDEX TO SUBROUTINES     *
1020 REM * PRINT SPRITE -       1400  *
1030 REM * AUSSIE SPRITE -      1900  *
1040 REM * REVERSE SPRITE -     1850  *
1050 REM * CHOOSE COLOUR -      1500  *
1060 REM * CHOOSE M/CLS -       1550  *
1070 REM * CHOOSE SCREEN -      1200  *
1080 REM * SAVE (DISK) -        1600  *
1090 REM * LOAD (DISK) -        1650  *
1100 REM * ERASE (DISK) -       1750  *
1105 REM * SAVE (TAPE) -        2000  *
1106 REM * LOAD (TAPE) -        2050  *
1110 REM * M/C PRINT SPRITE - 1300    *
1120 REM * GET DISK ERROR -     1700  *
1130 REM * CLEAR SPRITE -       1800  *
1140 REM * VIEW SPRITE -        1250  *
1150 REM * LOAD DOT$ -          1450  *
1160 REM * CLEAR INPUT TEXT - 1570    *
1170 REM * IMITATE SPRITE    - 1950   *
1180 REM ******************************
1199 REM ** SCREEN COLOUR **
1200 PRINT"▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓COLOUR (0-15)";:INPUTN
1210 POKES,N:POKES-1,N:GOSUB1570:GOTO510
1249 REM ** VIEW SPRITE **
1250 POKE1024+X+Y*40,Q:FORT=1TO21:FORR=0TO2:D=0:FORM=0TO7
1260 P=PEEK(1025+R*8+M+T*40):IFP=160THEND=D+2↑(7-M)
1270 NEXTM:POKESD(SN)+T*3+R-3,D:NEXTR:NEXTT
1280 GOTO510
1299 REM ** PRINT MULTICOLOUR GRID **
1300 PRINT"▓▓";:FORT=0TO20:PRINT"▓";:FORR=0TO23STEP2
1310 C=(PEEK(1065+R+T*40)*2)+PEEK(1065+R+T*40+1):C=C/160+1
1320 ONCGOTO1330,1340,1350,1360
1330 PRINT"  ";:GOTO1370
1340 PRINT"11";:GOTO1370
1350 PRINT"SS";:GOTO1370
1360 PRINT"22";
1370 NEXTR:PRINT"":NEXTT
1380 GETA$:IFA$<>CHR$(13)THEN1380
1390 GOSUB1400:GOTO510
1399 REM ** PRINT SPRITE GRID **
1400 PRINT"▓▓";:FORT=0TO20:PRINT"▓";:FORM=0TO2:P=PEEK(SD(SN)+M+T*3)
1410 PRINT"■";DO$(P);:NEXTM:PRINT"":NEXTT
1420 PRINT"▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓";SN+1:RETURN
1449 REM ** LOAD DO$ (DOTS) **
1450 DIMDO$(255):FORT=0TO255:N=T:FORR=7TO0STEP-1
1460 IFN-2↑R>=0THENP$=P$+"▓ ":N=N-2↑R:GOTO1480
1470 P$=P$+"■ "
1480 NEXTR:DO$(T)=P$:P$="":NEXTT:RETURN
1499 REM ** SPRITE COLOUR **
1500 PRINT"▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓COLOUR (0-15)";:INPUTN
1510 POKEV+39,N:GOSUB1570:GOTO510
1549 REM ** SPRITE M/COLOURS **
1550 PRINT"▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓COLOURS (0-15)";:INPUTN1,N2
1560 POKEV+37,N1:POKEV+38,N2:GOSUB1570:GOTO510
1570 PRINT"▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓                          ":RETURN
1599 REM ** SAVE TO DISK **
1600 POKE198,0:PRINT"▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓S:NAME";:INPUTN$
1610 OPEN2,6,2,"@0:"+N$+",S,W":FORT=0TO62:P=PEEK(SD(SN)+T):PRINT#2,P:NEXTT
1620 CLOSE2:GOSUB1570:GOTO510
1649 REM ** LOAD FROM DISK **
1650 POKE198,0:PRINT"▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓L:NAME";:INPUTN$
1660 OPEN2,8,2,N$+"*,S,R":GOSUB1700:GOSUB1570
1670 IFVAL(A$)>=20THENPRINT"▓DISK ERROR                         ":CLOSE2:CLOSE15:GOTO
510
```



```
1680 FORT=0TO62:INPUT#2,P:POKESD(SN)+T,P:NEXTT:CLOSE15:CLOSE2:GOSUB1400:GOTO500
1690 REM ** READ DISK ERROR **
1700 IFE=0THENOPEN15,8,15
1710 INPUT#15,A$,B$,C$,D$:RETURN
1749 REM ** ERASE DISK FILE **
1750 POKE198,0:PRINT"[illegible]E:NAME";:INPUTN$:OPEN15,8,15
1760 PRINT#15,"S0:"+N$+"*":E=1:GOSUB1700:E=0
1770 IFVAL(A$)=>20THENPRINT"[illegible]DISK ERROR                         ":CLOSE15:GOTO510
1780 CLOSE15:GOTO510
1799 REM ** CLEAR GRID **
1800 FORT=0TO62:POKESD(SN)+T,0:NEXTT
1810 GOSUB1400
1830 GOTO500
1849 REM ** REVERSE GRID **
1850 FORT=0TO62:POKESD(SN)+T,255-PEEK(SD(SN)+T):NEXTT
1860 GOSUB1400:GOTO500
1899 REM ** INVERT GRID **
1900 FORT=0TO62:POKE832+T,PEEK(SD(SN)+T):NEXTT:FORT=0TO2
1910 FORM=0TO20:POKESD(SN)+T+M*3,PEEK(832+((20-M)*3)+T):NEXTM,T:GOSUB1400
1920 GOTO500
1949 REM ** SPRITE MIMIC **
1950 POKE198,0:PRINT"[illegible]SPRITE";:INPUTN
1960 FORT=0TO62:POKESD(SN)+T,PEEK(SD(N-1)+T):NEXTT:GOSUB1570:GOSUB1400:GOTO500
1999 REM ** SAVE (TAPE) **
2000 PRINT"[illegible]S:NAME";:INPUTN$:OPEN1,1,1,N$
2010 FORT=0TO62:PRINT#1,PEEK(SD(SN)+T):NEXTT:CLOSE1:GOSUB1570:GOTO510
2049 REM ** LOAD (TAPE) **
2050 PRINT"[illegible]L:NAME";:INPUTN$:OPEN1,1,0,N$
2060 FORT=0TO62:INPUT#1,P:POKESD(SN)+T,P:NEXTT:CLOSE1:GOSUB1570:GOSUB1400
2070 GOTO500

READY.
```



Blopper

by Chris Preston

The program we are going to describe is not really a game, because there is nothing for a "player" to do. All you do is sit and watch the screen. Don't be put off though, the screen display is quite fascinating. It is also very useful, because it keeps our Editor amused for hours which means we get some peace and quiet ...

The basic idea is quite simple. The display consists of two hollow mountains (for want of a better description) at the bottom of the screen and a number of randomly-placed blocks at the top. A group of 'drops' then fall from the top of the screen, like a series of drops of water, and wend their way down through all the obstacles to the bottom slowly filling up the screen. It is the fact that no two runs are the same which make the program so addictive.

The main program

Line 100 sets the backdrop colour, and **lines 110 and 120** set up the SID chip to give some noises associated with the falling drops. **Lines 150 and 160** allow you to change the number of drops in a group; **line 180** sets up colour RAM to make sure that the drops turn out the right colour. **Lines 200 and 210** draw a border round the screen.

The GOSUB 1000 on **line 220** draws the 'mountains' and **lines 240 to 280** draw the blocks at the top. **Line 290** clears the top line of the screen.

Line 300 picks a random point on the top line for the drops to start from. It also sets the variable **S**, which is the address of the first drop. **Line 310** sets **CLNG** to the number of drops; and **I1** to 999 (see the section on subroutine 4000).

The main loop of the program runs from **lines 320 to 650**, and controls the movement of the drops about the screen. **Line 320** puts the address of the drop into the array **DRP**. **Line 350** puts the drop on to the screen, and **line 360** calls subroutine 4000 which produces the sound for the drop falling. The next few lines of the program check for empty spaces around the drop, and put a value into the variable **D** which will be used to give the new address of the drop.

Line 380 checks if the space below the drop is empty. If not, **line 440** checks the spaces to the left and right of the drop to see if it can move that way.

If they are both free, **line 450** tosses a coin to see which way to move. If the drop is completely blocked in, **line 480** sends the program down to **line 610**.

Lines 510 and 520 remove the last drop from the screen. **Line 580** updates the value in S using the variable **D**, after which the program goes back to line 320.

The program gets to line 610 when a drop gets 'stuck' such that it cannot move in any direction. What happens now is that the drop is left where it is and the other drops in the group carry on without it. **Line 610** checks if the 'stuck' drop is the last one in the group; if it is, the program goes back to line 300 to start a new group.

Line 620 decrements the number of drops in the group, and **line 630** sets the value of S to that for the drop before the one which got stuck. the program then continues normally from line 350.

The subroutines

Subroutine 1000 controls the setting up of the 'mountains' at the start of the program. The variables **PA** and **CA** are the addresses in screen and colour RAM respectively of the top of the mountain. By calling **subroutines 2000** (to draw a mountain) and **3000** (to erase a mountain) the pattern of the program is achieved. That could of course be done more simply by means of PRINT statements, but this way is more interesting!

Subroutine 2000 is used to draw a 'mountain' on the screen. In fact it just draws one line, and is called from a FOR-loop in subroutine 1000 to build up the shape.

Sobroutine 3000 is much the same as 2000, except that it erases the mountain shape by plotting spaces.

Subroutine 4000 produces the sound for the program. **Line 4000** calculates a value for **I** depending upon which line on the screen contains the drop. **Line 4010** compares I with **I1**, which is the value of I from the last time 4000 was called; 4010 will not produce a note if I is greater or equal to I1 – this means the note dies away while the drops are moving horizontally, which produces a more interesting sound while the drops are threading their way through the blocks in the top of the screen. It also stops the note getting higher in pitch when a drop gets 'stuck' and the previous one takes over as leader of the group.

Line 4030 sets the frequency of the note, and **line 4040** actually produces the sound.

Important variables

DRP()	holds the address in screen RAM of all the drops in the group.
CLNG	the number of drops still in the group. If a drop gets "stuck" it is left behind, and CLNG decremented by 1.
D	contains the displacement between the current position of a drop and its new position. This is 40 for down, 1 for right and -1 for left.
LNG	number of drops in a group. The default of 6 is set in line 140, but can be overridden in lines 150 and 160.
S	the address of the leading drop in the group.

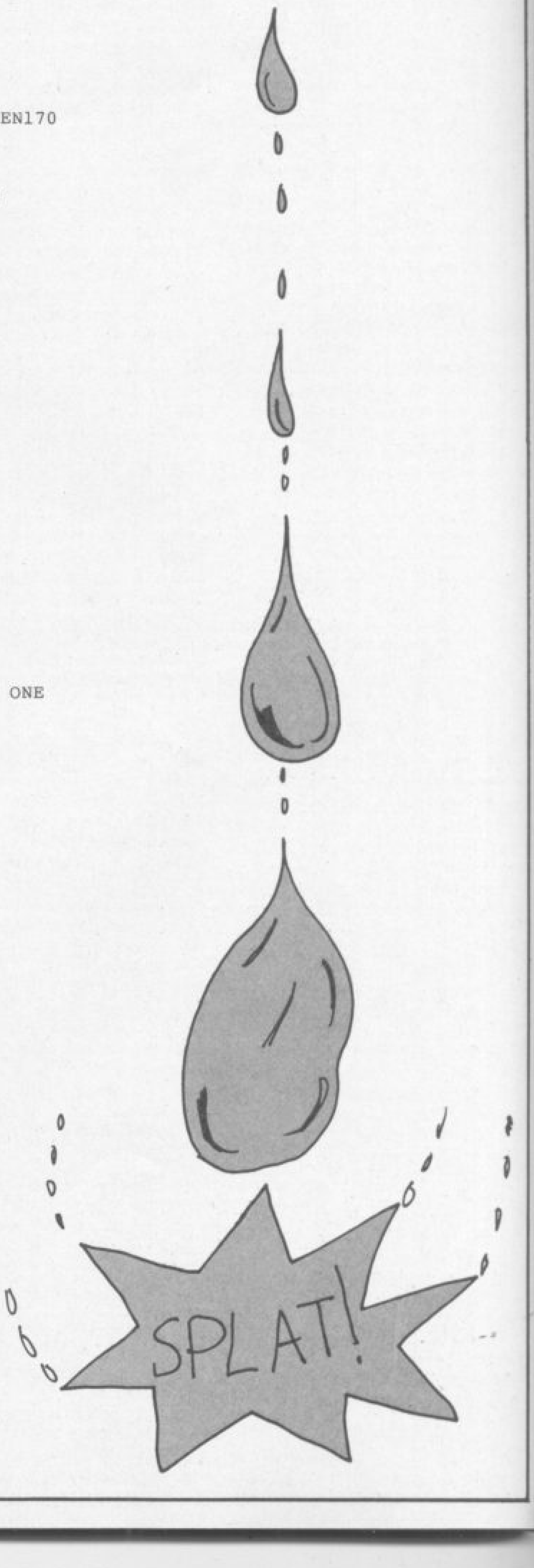
This program was originally written by an Italian for the Pet. I liked it, and so I asked Chris to write a 64 version with Added Sound and Colour. I'd like to give due acknowledgement to the original author – if you're out there, drop me a line! Ed.



Blopper

```
BLOPPER ***

100 POKE53281,3:REM SET BACKGROUND COLOUR
110 SC=54272:FORI=SCTOSC+24:POKEI,0:NEXT:REM SET UP SID
120 POKESC+5,9:POKESC+24,15:REM SET ATTACK/DECAY AND VOLUME
130 PRINTCHR$(147)
140 WALL=160:BALL=81:BOX=102:MAX=40:LNG=6
150 PRINT"CHANGE THE PARAMETERS (Y/N) ";:GOSUB9000:IFR$="N"THEN170
160 INPUT"HOW MANY DROPS (2-10)";LNG:IFLNG<2ORLNG>10THEN145
170 DIMDRP(LNG):SA=1024
175 PRINT"[CLR][CUDX18][SPCX10]PLEASE WAIT A MOMENT"
180 FORI=55296TO56295:POKEI,10:NEXT:REM SET CHARACTER COLOURS
190 REM SET UP SCREEN BORDER
200 FORI=0TO24:POKESA+I*40,WALL:POKESA+I*40+39,WALL:NEXT
210 FORI=1TO38:POKESA+960+I,WALL:NEXT
220 GOSUB1000:CA=55296
230 REM PUT IN RANDOM BLOCKS
240 FORI=1TOMAX
250 P=450*RND(1)
260 FORJ=0TO2
270 IFPEEK(SA+P+J)=32THENPOKESA+P+J,BOX:POKECA+P+J,6
280 NEXTJ,I
290 FORI=1TO38:POKESA+I,32:NEXT:REM CLEAR TOP LINE OF SCREEN
300 S=SA+38*RND(0)+1:REM PICK START POINT FOR DROP
310 CLNG=LNG:I1=999
320 DRP(CLNG)=S:REM REMEMBER LOCATION OF DROP
350 POKES,BALL:POKECA+S-SA,0:REM PUT DROP ONTO SCREEN
360 GOSUB4000
370 REM FIND WAY TO MOVE DROP
380 IFPEEK(S+40)=32THEND=40:GOTO510
440 R=(32=PEEK(S+1)):L=(32=PEEK(S-1))
460 IFRANDLTHEND=1+2*(RND(1)<0.5):GOTO510
470 IFRTHEND=1:GOTO510
480 IFNOTLTHEN610
490 D=-1
510 TL=DRP(1):REM REMOVE OLD DROP
520 IFTL<>0THENPOKETL,32
540 FORI=2TOCLNG:DRP(I-1)=DRP(I):NEXT:REM MOVE ALL DROPS DOWN ONE
580 S=S+D:GOTO320
610 IFCLNG<=2THEN300
620 CLNG=CLNG-1
630 S=DRP(CLNG)
650 GOTO350
1000 PA=1435:CA=55707
1010 FORI=0TO11:GOSUB2000:NEXT
1100 PA=1450:CA=55722
1110 FORI=0TO11:GOSUB2000:NEXT
1200 PA=1515:CA=55787
1210 FORI=0TO9:GOSUB3000:NEXT
1300 PA=1530:CA=55802
1310 FORI=0TO9:GOSUB3000:NEXT
1400 PA=1595:CA=55867
1410 FORI=0TO9:GOSUB2000:NEXT
1500 PA=1610:CA=55882
1510 FORI=0TO9:GOSUB2000:NEXT
1600 PA=1435:CA=55707
1610 FORI=0TO1:GOSUB3000:NEXT
1700 PA=1450:CA=55722
1710 FORI=0TO1:GOSUB3000:NEXT
1800 RETURN
2000 FORJ=1TO2*I+1
2010 POKEPA+I*39+J,BOX
2020 POKECA+I*39+J,6
2030 NEXT:RETURN
3000 FORJ=1TO2*I+1
3010 POKEPA+I*39+J,32
3020 POKECA+I*39+J,6
3030 NEXT:RETURN
4000 I=INT((2024-S)/40)
4010 IFI1<=ITHEN4050
4020 I1=I
4030 POKESC+1,I*2+10
4040 POKESC+4,32:POKESC+4,33
4050 RETURN
5999 RETURN
9000 INPUT"";R$
9020 R$=LEFT$(R$,1)
9030 IFR$<>"Y"ANDR$<>"N"THEN PRINT "Y(YES) N(NO)";:GOTO9000
9999 RETURN
```





Todd's Lore

These delightful characters

There are three ways of getting characters on to the screen of the Vic-20 or Commodore 64. You can print them as character strings, you can print the CHR$ values of the characters, or you can POKE the character straight into the screen memory (not forgetting to POKE the colour memory at the same time.)

There are also two modes of display, graphics mode and text mode. The Vic powers up in graphics mode with capital letters being produced unless the shift key is used, in which case we get graphics characters.

In text mode, the normal character is the lower case letter and shift produces the capital, just like a typewriter. But, whether you are in text or graphics mode, the characters in the screen memory remain the same, it is the character generator that is switched.

Although Basic normally uses capital letters in programs, it is actually unshifted letters which must be used – which explains why, in text mode, capital letters (which are shifted) do not work.

For this month's Lore I have produced these four tables of characters for your delight, delectation and reference.

The first two tables show the complete character sets and their screen POKE values in both modes. The small numbers under the characters show the actual decimal POKE values; the column/row numbers could be used to find the hex codes if needed.

The other two tables show the same character sets as they appear when used with the CHR$ command – thus PRINT CHR$(54) produces the figure "6".

Reversed characters

There are no reverse-field equivalents in the CHR$ character set, as these are obtained using the RVS ON key (which is CHR$(1B), as it happens).

This is one of a (theoretical) maximum of 64 special control characters which when PRINTed don't normally generate a visible character but instead perform some screen control function. For instance, CHR$(17) is the same as the cursor down key. So **PRINT CHR$(17)** has the same effect as pressing CRSR down.

Controls

All the Vic control characters are listed in the CHR$ tables, and I've also included the C64 control characters too. Note that the Vic *doesn't* have CHR$(129); nor does it have CHR$(149) to CHR$(155).

The ASCII value of any key pressed (found using the ASC function following a GET command) will be the same character values shown, which is why the function keys are also listed.

Most of the control codes are self-explanatory, although the LOCK and UNLOCK commands may be unfamiliar. They simply lock the computer into its current display mode (graphics or text) such that a user cannot alter them with the CBM/SHIFT key combination.

When a key is pressed with the CTRL key, the appropriate control code is generated and the appropriate action taken. The exception is when an odd number of inverted commas has been typed. In this case, to help identify these codes (some help!) the computer generates a reverse-field character; for control codes in columns 0 and 1 these are the same characters as those in columns 4 and 5, but in reverse. And for the shifted control characters in columns 8 and 9, they appear as the reversed version of the corresponding characters in columns C and D.

Tricks with control characters

This means that control codes which can't be produced directly by pressing a key *can* be generated in two ways – by using their CHR$ values or by fooling the computer into thinking that the character embedded in a string is a control character.

If we are in graphics mode, and want to include a TEXT control character, the simplest way would be to PRINT CHR$(14). But the TEXT control could be incorporated in a character string, say A$. First type:

A$="   "

(Note the double quotes!). Then use the DEL key to delete the second of these two quotes. After the first quote the computer goes into programmed cursor mode, the second causes it to revert to direct mode.

Now select reverse field (press RVS ON) and type the appropriate letter, in this case "N". Cancel the reverse field mode (RVS OFF), type the closing quotes and press RETURN. The TEXT control character is now part of A$, and "PRINT A$" should flip the display into TEXT mode. Voilá!

This technique can be extended to include nearly all control characters. But be wary of trying to use CHR$(0) or CHR$(13): these will cause problems.

Listing control characters

When a program with control codes is LISTed, most will appear in their normal reverse field form. But those which have to be actioned regardless of the quotes mode (such as DEL) will actually be actioned during the LISTing.

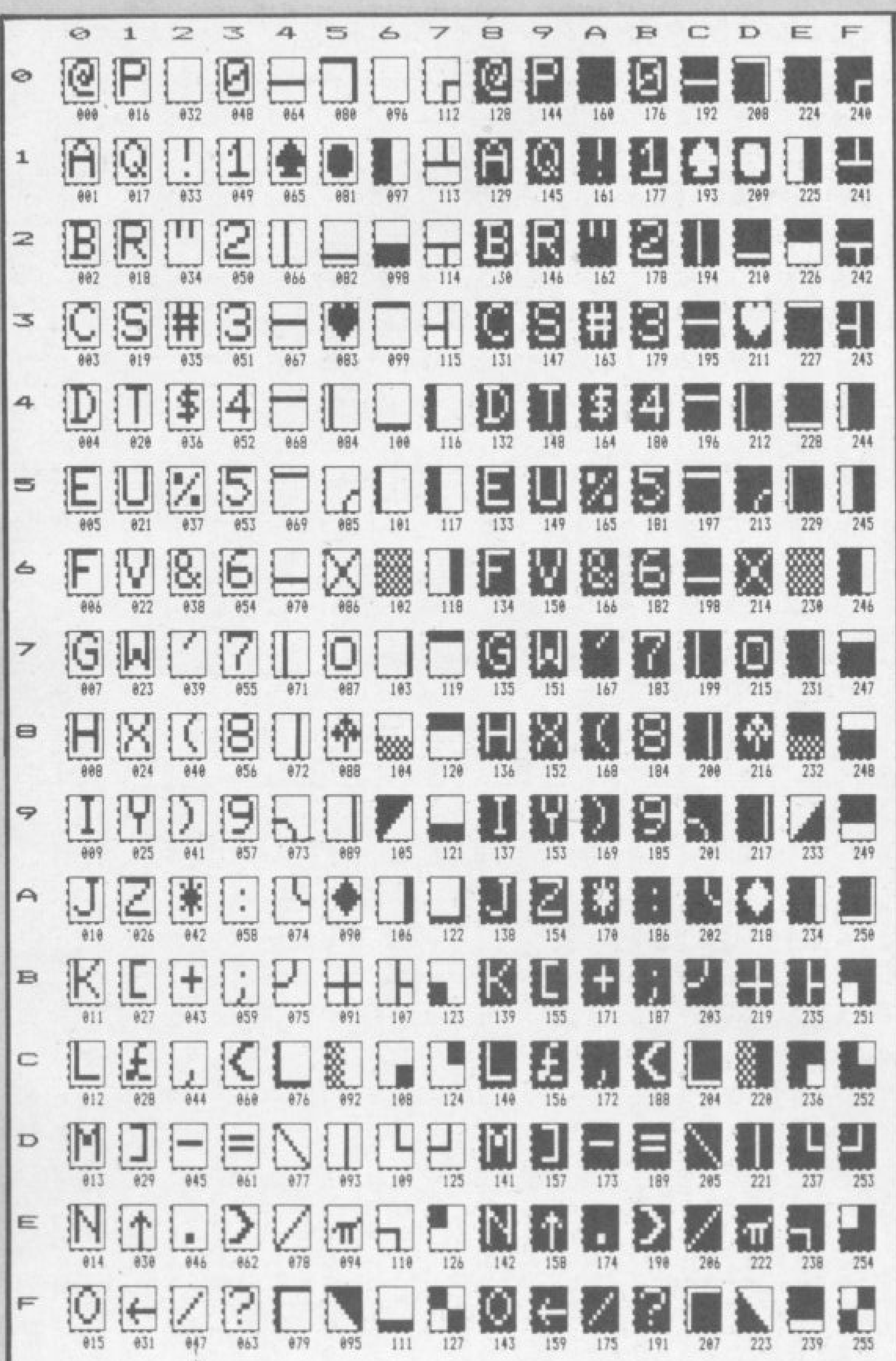
So the technique of 'forcing' a control character such as DEL (using RVS-"T") means that characters on a Basic line can be deleted during listing. This could be useful for hiding passwords or quiz answers; and it's worth experimenting with – although don't place too much reliance on this method of security as it is very easily broken by someone with a bit of inside knowledge.

A note for Pets

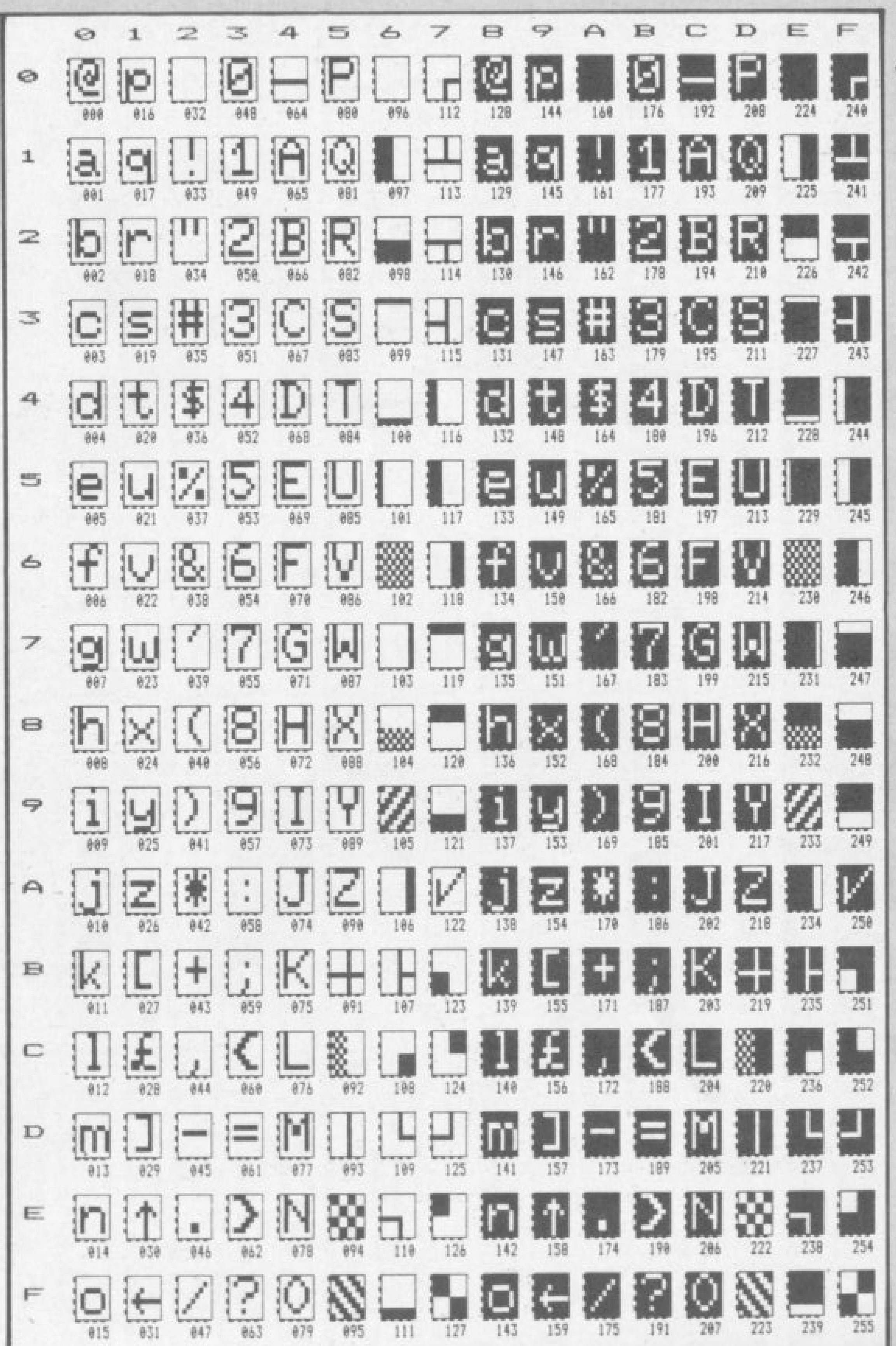
In the CHR$ tables columns 6 and 7 are a repeat of C and D, and E and F are repeats of A and B. This is slightly different to the way that the Commodore Pet computers handle CHR$ values. But with the exception of columns 6 and 7, some of the control characters, and the pound sign CHR$(92), these lists also apply to Pets.



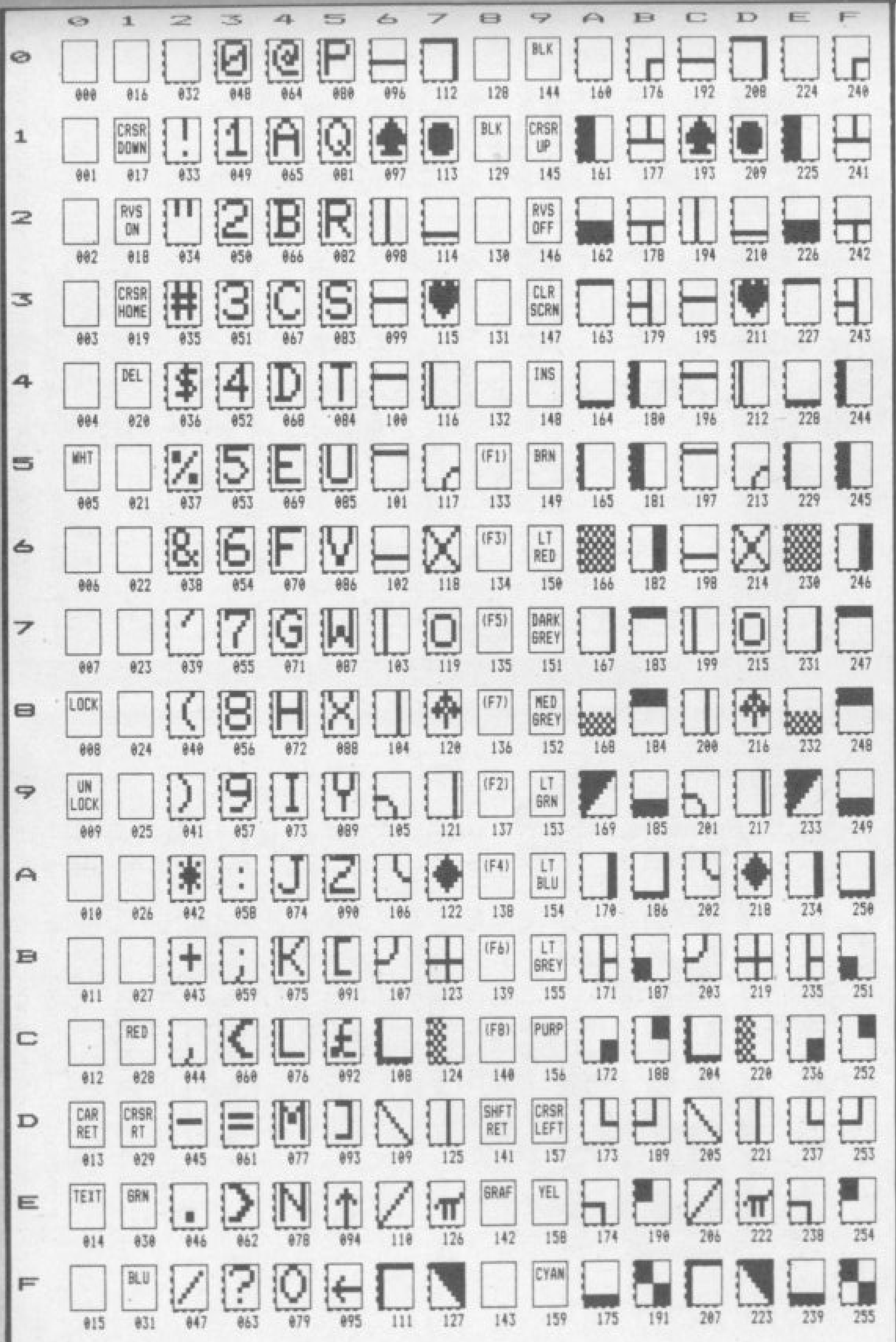
Todd's Lore



POKE VALUES — GRAPHICS MODE



POKE VALUES — TEXT MODE



CHR$ VALUES — GRAPHICS MODE



CHR$ VALUES — TEXT MODE

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REMEMBER

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Hieroglyphic

by David Roberts

Unexpanded Vic

```
1 POKE56,20:CLR:P=0:PRINT"[CLR]INITIALISING":GOSUB15:GOSUB20
2 REM6DKR83
3 GETA$:IFA$=""THEN3
5 IFA$="C"THENGOSUB15
6 IFA$="c"THENP=1-P:GOSUB20
7 IFA$="S"THENGOSUB25
8 IFA$="s"THENGOSUB30
9 IFA$="[F1]"THENF=1-F
10 X=X-(A$="[CUR]")-(A$="R")-(A$="r")+(A$"[CUL]")+(A$="L")+(A$="l"):IFX<0ORX>127THENX=64
11 Y=Y+(A$="[CUP]")-(A$="L")+(A$="r")-(A$="[CUD]")-(A$="R")+(A$="l"):IFY<0ORY>159THENY=80
12 N=Y+5120+160*INT(X/8):POKEN,PEEK(N)OR2^(7-XAND7)
13 IFF=1THENPOKEN,PEEK(N)ANDNOT2^(7-XAND7)
14 GOTO3
15 FORN=5120TO7679:POKEN,0-55*(P=1):NEXTN:X=64:Y=80:F=1
16 FORH=5120TO7679STEP160:POKEH,255+255*(P=1):POKEH+159,255+255*(P=1):NEXTH
17 FORV=5121TO5278:POKEV,128-P:POKEV+2400,1-253*(P=1):NEXTV:RETURN
20 POKE36879,8+P:POKE36864,17:POKE36865,45:POKE36866,144:POKE36867,21:POKE36869,253
21 PRINT"[CLR]":FORH=1TO16:FORV=1TO10:POKE7663+16*V+H,V+10*H-11:NEXTV,H:POKE650,128:RETURN
25 GOSUB35:POKE780,1:POKE781,1:POKE782,1:POKE157,128:SYS65466:POKE780,0:SYS65469
26 POKE780,0:POKE781,0:POKE782,30:POKE0,0:POKE1,20:SYS65496:GOSUB20:RETURN
30 GOSUB35:POKE780,1:POKE781,1:POKE782,0:POKE157,128:SYS65466:POKE780,0:SYS65469
31 POKE780,0:SYS65493:GOSUB20:RETURN
35 POKE36879,127:POKE36864,12:POKE36865,38:POKE36866,150:POKE36867,46:POKE36869,240
36 PRINT"[CLR]":POKE650,0:RETURN
```

This tight little program turns a Vic into a simple but effective hi-res drawing machine. You can create pictures on a drawing screen of 128 horizontal by 160 vertical co-ordinates; you draw in black or white 'ink' on white or black 'paper' respectively, and you SAVE pictures to tape and subsequently LOAD them.

Be careful when entering the code – you'll have to use abbreviations to fit it all in (see Appendix D of the *Friendly User Guide*) and even then a PRINT FRE(0) will show you've got three bytes left once the initialisation has been completed.

That's why there's no room for on-screen instructions and any colour manipulation apart from switching from white to black or back again.

That's done with shifted C. 'Pen' control is toggled by hitting f1; press it once and you're in drawing mode. Use the cursor controls to move the pen around the screen horizontally or vertically, keys L and R for diagonal movement, and in drawing mode it will leave a trailing line mode, when the cursor controls or L and R will move the 'pen-tip' *without* drawing.

Unshifted C clears the screen. Pressing S saves the current display on cassette, shifted S loads it again (since the LOAD doesn't include any filename specifier you'd better note the tape counter reading when you SAVE and rewind to that point before attempting a LOAD).



Kaleidoscope

by Neil Phillips

Unexpanded Vic

Kaleidoscope uses only low-resolution graphics so the effects are limited. Some lovely colours and patterns, though, and they are random – animated wallpaper?

```
2 X=RND(-TI)
3 DEF FNR(X)=INT(RND(0)*X+.99)
4 D=FNR(255): E=FNR(128): F=FNR(64)
5 ZZ=30720: XX=3
6 CL(0)=ASC("")+128
7 CL(1)=ASC("▚")-64
8 CL(7)=ASC("")
9 CL(3)=ASC("-")-128
10 CL(4)=ASC("+")-128
11 CL(5)=ASC("|")-128
12 CL(2)=ASC("▒")-64
13 CL(6)=ASC(":")
18 N1=7680: N2=22: N3=1.046: N4=21.9999
19 PRINT "[CLR]"
20 FOR W=3 TO 4
30 FOR I=1 TO 13
40 FOR J=0 TO 13
50 K=I+J
60 CK=((J*D/(I+D)+I*W/E)ANDF)
62 CK=INT(CK-7*INT(CK/7))
64 C=CL(CK)
70 Y1=N1+N2*INT(N3*I)
80 Y2=N1+N2*INT(N3*K)
90 Y3=N1+N2*INT(N3*(N4-I))
100 Y4=N1+N2*INT(N3*(N4-K))
110 POKE I+Y2,C: POKE K+Y1,C: POKE N2-I+Y4,C
111 POKE I+Y2+ZZ,XX: POKE K+Y1+ZZ,XX: POKE N2-I+Y4+ZZ,XX
120 POKE N2-K+Y3,C: POKE K+Y3,C: POKE N2-I+Y2,C
121 POKE N2-K+Y3+ZZ,XX: POKE K+Y3+ZZ,XX: POKE N2-I+Y2+ZZ,XX
130 POKE I+Y4,C: POKE N2-K+Y1,C
131 POKE I+Y4+ZZ,XX: POKE N2-K+Y1+ZZ,XX
135 XX=FNR(8)
140 NEXT J
145 POKE 36879,FNR(255)
150 NEXT I
155 POKE 36879,FNR(255)
160 NEXT W
170 GOTO3
```

Suppliers

STACK in profile

by Bohdan Buciak

There's a standing joke in Liverpool – one of these days, the *Liverpool Echo* will advertise a job. As jokes go, this one's pretty tragic for the huge mass of unemployed people who have to live in the shadows of a once prosperous city.

So when Liverpool-based Stack Computer Services announces that it's taken on 80 new staff in the last year, and that it's expanding its manufacturing base, you might conclude that this company really does know its business.

Stack is one of the more active suppliers of Commodore add-ons. We put Bohdan Buciak on the 8.05 to Lime Street to find out more.

Users of Commodore's small computers will know Stack through its RAM cartridges, four-slot motherboards, various interfaces, for printers and instruments – and now, its new lightpen and SLR rifle. That's about 45 or so Vic and 64 products in all.

You might have guessed, then, that Stack is doing pretty well out of the home computer market.

But as with most success stories, there are usually potentially boring tales of garden-shed beginnings to tell. Jeff Orr, Stack's managing director, doesn't mind telling them. And fortunately he's not boring either.

"I founded Stack about five years ago, from the sitting room of my house." Not quite a garden shed. "I already had 17 years in computers and electronics, did some programming and consultancy work for ICI." (He's also done a lot of other things not strictly compatible with his engineering degree from Liverpool University. Like running a chain of mobile discos and DJing. He's reputed to have a collection of 2,000 Golden Oldies.)

"We were involved in the dealer/distribution business right from the beginning, but we're different to other dealers because we're strongly tied to large industrial concerns and government departments. That's most of the business, in fact. We don't just sell micros and add-ons, we sell a unique service of consultation and analysis." And quite a lot of Vic/64 goodies, one might add ...

Big breaks

Now he's selling Sirius, IBM and DEC machines too – anything to give the customer a wide range of choice, it seems. "We were also doing a lot of specialist interfacing so it seemed a logical step to go into manufacturing." It was probably also a logical step for Commodore to approach Stack to design peripherals for the Vic 20, since the company was already producing interfaces and graphics cards for the Pet series.

Orr wasn't surprised by the request, anyhow. "They asked us because they knew we could do



the job." Why couldn't Commodore manufacture its own peripherals? "The request usually comes from the marketing people because Commodore hasn't been able to get its act together. Commodore sends us the specifications, the price they'd like to see and we send them a prototype."

Was going into large-scale manufacturing something of an upheaval for Stack? "No, we simply added more staff and facilities to cope." And does the relationship with Commodore still work? "Yes, but now we're in a position to give them a straight yes or no."

Two-sided Stack

So there are two sides to Stack; its distribution/dealer activities now combined with a growing manufacturing base. And that manufacturing isn't confined to Commodore orientated peripherals. "We now manufacture a range of peripherals for the Vic, Commodore 64, BBC, Atari and Spectrum micros – any machine that's selling well."

Granted, you don't put money on a loser, and there are plenty of those in today's home micro market. In that list, the only potential loser is Atari – and Atari's worldwide sale means it's worth Stack looking for export markets.

Going into manufacturing is all well and good. But in the cut-throat peripherals market, you've got to be competitive – for instance, when you're shopping around for Vic memory, it soon becomes obvious that Stack's RAM cartridges aren't the cheapest around.

But that doesn't bother Orr; competitiveness is one thing, reliability is another. "Our RAM packs will be around for the life of the machine because we're going for quality and we're not prepared to cut corners."

Fine words. Is that rationalisation to justify his prices? "To be fair to the user, you must design the product to Commodore's specifications. A RAM pack's got to be able to do its job, to hold data; not to bring down the machine by drawing too much current. Our packs draw next to no current – they work."

This implies that some of Stack's RAM-pack competitors are less than reliable (true, true) and Orr's got little time for them. He's not reticent in expressing his opinions either: "the whole industry is in danger of being tarred with the same brush. We've got to demonstrate that there are ethical and responsible companies in this business". Like Stack, of course.

And Jeff Orr knows the industry he's in well enough; for instance, he knows that whenever Stack comes up with a new product, somebody comes along and copies it. So it's no fun being at the front-end of the market?

Neil Cornes, Stack's new products man, has been sitting patiently through the interview – cool, a professional, taking it all in. But he gets a word in here. "You can't take the attitude that you won't do something because people will copy it. We don't complain; it's churlish. we just accept the fact." Orr again, to make the point stick: "Nobody's been as successful as we are when they copy because we're always a step ahead. we know there's a chap in paris copying our lightpen ..."

Lightpens and rifles

Ah, the Stack lightpen! Better find out what Orr's got to say about that. "The lightpen came about simply because there's a lightpen input on the Vic and Atari machines – Commodore didn't ask us to produce one." Cornes chips in: "We spent two years researching and developing the thing, redesigning it every time new devices came along. Now we've got ten pieces of software for it."

The lightpen doesn't come cheap at £25 but it does add a new dimension to home computing. Jeff Orr reckons it *is* as cheap as Stack could make it. "We decided to produce an effective lightpen at low-cost. What's the point in trying to gain a better resolution than the machine can use?"

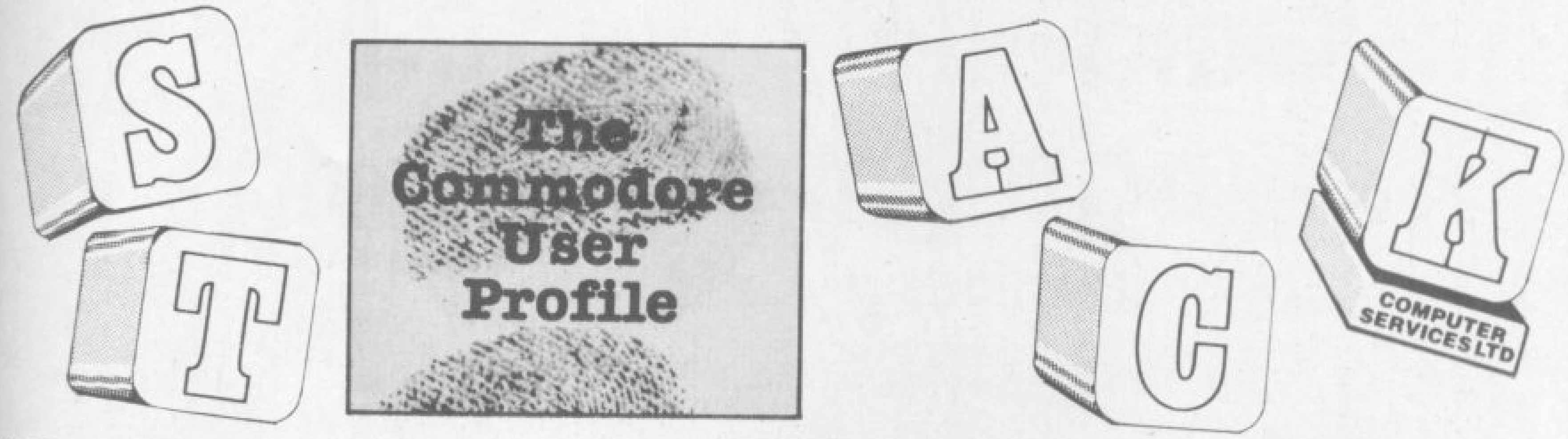
The SLR (Stack Light Rifle) was a logical development from the lightpen. "If you can plug in a lightpen, you can plug in an SLR." There's a 12ft cable and a plastic gun with which you 'fire' at targets on the screen. Sounds simple? "It took a lot of research and development to make it work. A hell of a lot of money went into it, especially to get it to work at 12 feet."

How come Stack is first on the market with this type of thing? Orr gets to answer this one (after all, he's the boss). "Because we're orientated around technology rather than finance and sales people. We're probably the first micro company with a research and development department. In our first year, we spent £160,000 on research – a big chunk of our sales at that time."

"The R&D people say they come up with the ideas for new products but the sales guys try to take some credit too. We hold think-tank type sessions where we make ridiculous suggestions. Some of the ideas aren't as daft as we'd thought, so we go ahead with them."

Despite putting a lot of resources into manufacturing, Stack continues to act as its own distributor. It sells directly to dealers, chain-stores and the

Nice people to do business with



High Street multiples, and on the Vic 64 side there's no favouritism. "We'll allow any dealer on Commodore's authorised list to stock them."

Dealing with dealers

But what does Stack do for its dealers? And do they in turn like the company enough to stick with Stack? "We get so much repeat order business from existing dealers that we don't do much to chase them to continue ordering our stuff. We're not in the business of stuffing a product down a dealer's throat if it doesn't suit his market. We're more into making sure that the dealers who stock us are well supported."

Orr decides to qualify that holier-than-thou statement. "We'll contact a dealer a fair amount in the early stages to make sure that he knows about the product and is organised for supply." Just as well.

So who matters more, the dealer or the customer? Orr doesn't hesitate here: "We're not selling to dealers, we're selling through them to the customer." This is obviously a matter of principle to Stack even if it does sound corny.

Taking a step further, Orr is prepared to distinguish between the big High Street multiples and the smaller, more specialised dealers. Obviously a chain-store won't be prepared to give substantial customer support. "We deal with Smith's, Dixon's, the Spectrum chain. But we're supplying them with plug-in-and-go products because they're geared for volume rather than the technical sell.

"Specialised dealers get products like our programming support cartridges (assembler, dissassembler, easy graphics commands, high-speed cassette load and save) because they're devices for interested programmers, devices that need support." This looks to be a pretty sensible approach and suggests that there's more to Stack than the 'make it cheap and sell it quick' ethos so prevalent in the home micro business.

Atlantic crossing

'Selling', though, is a small term that can cover vast areas – which is exactly what Stack's trying to do. It already has a little of the international market via Stack Inc in the States, set up two years ago by Orr's brother (who just happened to live in Denver at the time). "It was quite easy really."

But there must be some differences, surely? "The most popular products in the States seem to be the four-slot motherboard and the lightpen with its games tapes. Of course, marketing is different because it's such a huge place. You could see the seven biggest UK distributors in a week; in the States, it could take months."

Apart from America, Stack is exporting to Europe and a lot of English speaking countries. International marketing looks like something of a priority; "We already attend international shows and we'll be extending our commitment to spend more on overseas operations."

Despite that, Stack is still involved in mail-order in the UK – which is not the most effective way of selling a lot of products quickly. Stack does it for high-sounding reasons: "We wouldn't be involved in mail-order if customers could get complete satisfaction from dealers. We do get complaints about the dealers' ability to supply or repair our products. And we want to demonstrate that 'Stack' on a product means that Stack is *behind* it." Another principle?

These sound like genuine sentiments, though – especially as Orr is honest enough to reveal the flip-side of the coin. "Dealers get inundated with offers from all sides. Using mail-order, we can kick-off a product and eventually demonstrate that there's a demand for it." Nothing wrong with that; it sounds like good business practice. But then maybe an ethical and responsible attitude to business *is* good practice ...

Views over Commodore

Stack has dealt with Commodore for long enough to be able to make a few useful observations. On the Vic: "Still represents excellent value for money and we'll continue to support it with peripherals. Where we're designing a product for the Commodore 64, we'll adapt it for the Vic but we wouldn't undertake a major Vic only product."

The Commodore 64: "A superb machine and it'll be every bit as successful as the Vic, especially since Commodore is now in a position substantially to reduce its price. It's got good graphics – a very fair system of sprites – and provision for an alternative processor. Commodore has already shown CP/M working on it." And that's not just going to open up business horizons (most business software runs under CP/M) but will also allow more languages, like Pascal and Fortran, to be used.

How about the 64's identity crisis? "It was *Commodore* who had the identity crisis. The company seemed to temporarily lose its sense of direction. Until the 500 and 700 series came along, we felt a clear sense of direction from them. Now, we don't know what they're doing."

A sense of direction is gained by knowing the market and knowing what it wants. It's arguable that Commodore may have temporarily lost that knowledge. But Orr argues that there's a difference between what people want and what they say they want. "We're not saying we know better. We *do* attempt to understand the market but we don't listen to what it says it wants – we reckon we're wiser."

That may sound a little arrogant, but it's not really. Orr is simply prepared to back his own judgement. "I'm a computer fan and if I can't see a purpose in something, I don't make it." And just to hammer the point home, "We don't have dead stock. We haven't manufactured a product that hasn't sold successfully."

Stacks of success

With its customer orientated attitude, Stack has grabbed a reasonable chunk of success in a short time. But success can corrupt.

Orr says Stack is currently in a state of transition in size. "Twelve months ago, everybody here knew each other by their christian names. There were 20 people then, and the atmosphere was relaxed and informal. Now we've about 100 staff and I don't know half of them."

Cornes: "I don't think anybody in the company wanted to remain at the 20 level. About three years ago, the whole business was like a cottage industry. It couldn't stay that way." He's probably right: small companies tend to go under in a high-growth business. "In any case, it's gratifying to know that with the economy the way it is, we're employing more people." He really means it too. After all, he's a Liverpudlian; and the docks lie empty just behind his office.

Stack is certainly ambitious and Jeff Orr throws around the usual easy phrases like "we must become more efficient" and "we would like to become the major home computer add-on company".

But it's gratifying to know that he's going to try to do it without losing sight of the customers who buy Stack products. that looks like being a sound basis for his future – and for the confidence of we customers.

The Guide to Assembly Language Programming

Part 5 – The Instructions by David Pinless

The 6502 microprocessor is the brain of your Vic and/or 64, and it understands only one language – 6502 machine code. A program which lets you enter assembly language instructions like 'LDA' is called an assembler; and it allows you to enter 6502 mnemonics which are then 'assembled' into machine code for you. The 6502 does not understand 'LDA' as an instruction itself: the assembler, which is itself a machine-code program, translates the instructions into code for you.

Now, Basic is a huge (about 8K) machine-code program which lets you enter much higher-level instructions like 'PRINT'. Basic interprets each program line as the program is RUN and converts it into machine-code. However many times the program is RUN, the Basic interpreter translates the Basic instructions into machine code each time anew. That's why Basic is quite slow – because the 6502 is handling both the code for the Basic interpreter *and* the program you are running.

It is also possible to have a *compiled* high-level language. Here, high-level instructions are compiled once only into machine code; and the program is run subsequently *always* as a machine-code program. Basic is delivered with all home computers that I know of as an interpreted rather than a compiled language.

There are 56 assembly language instructions for the 6502, some of which have more than one addressing mode. Since the instruction register inside the microprocessor is eight bits wide, there are a theoretical 256 unique instructions the 6502 could handle: in actual fact only 149 (the 56 instructions and their different addressing modes) are used.

The complete 6502 instruction set

Without further ado we go on to list every instruction your 6502 understands. The descriptions that follow go hand in hand with your **Commodore User** wallchart from the last issue. The instructions have been grouped by function, and each box in the wallchart contains the hex code for that instruction according to its addressing mode. The little number at the top right hand corner of the box is the number of bytes for the instruction.

Sitting comfortably?

Six transfers between internal registers

These six instructions are all one byte long and use implied addressing. Although the word 'transfer' is used, 'copy' might have been better – because the contents of the register from which the data is transferred remain unchanged.

TAX: Transfer the contents of the Accumulator into the X register
TXA: Transfer the contents of the X register into the Accumulator
TAY: Transfer the contents of the Accumulator into the Y register
TYA: Transfer the contents of the Y register into the Accumulator
TSX: Transfer the contents of the Stack pointer into the X register
TXS: Transfer the contents of the X register into the Stack pointer

Note the slight asymmetry in the instructions, in that transfers only exist between the stack pointer and the X register, not the Y.

Six transfers between memory and registers

These permit the transfer of data to or from memory and internal register accumulator, X register and Y register. Again note that the transfers are really copies, whichever way the data flows. There are different ways of retrieving the data from memory and sending it back, as specified by the addressing mode, so accordingly the instructions can be two or three bytes long.

LDA: LoaD the Accumulator from memory
STA: STore the contents of the Accumulator in memory
LDX: LoaD the X register from memory
STX: STore the contents of the X register in memory
LDY: LoaD the Y register from memory
STY: STore the contents of the Y register in memory

Four transfers between stack and registers

The stack is nothing more than a special area of memory reserved for storing information on a LIFO basis. The stack resides in page 1 of memory when using the 6502, and there are four special instructions to copy the contents of the accumulator or status register to or from the stack.

PHA: PusH the contents of the Accumulator onto the stack
PLA: PulL the contents of the stack into the Accumulator
PHP: PusH the contents of the status register (P) onto the stack
PLP: PulL the contents of the stack into the status register (P)

Whenever any of these instructions is used, the stack pointer is automatically updated.

Four comparison instructions

Quite often, a programmer may wish to compare the contents of a memory location with the contents of an internal register. If a comparison is required between two memory locations, the contents of one must first of all be loaded into a register. All four instructions leave the contents of the memory location and the internal register unchanged. The instructions can be two or three bytes long, depending on the addressing mode.

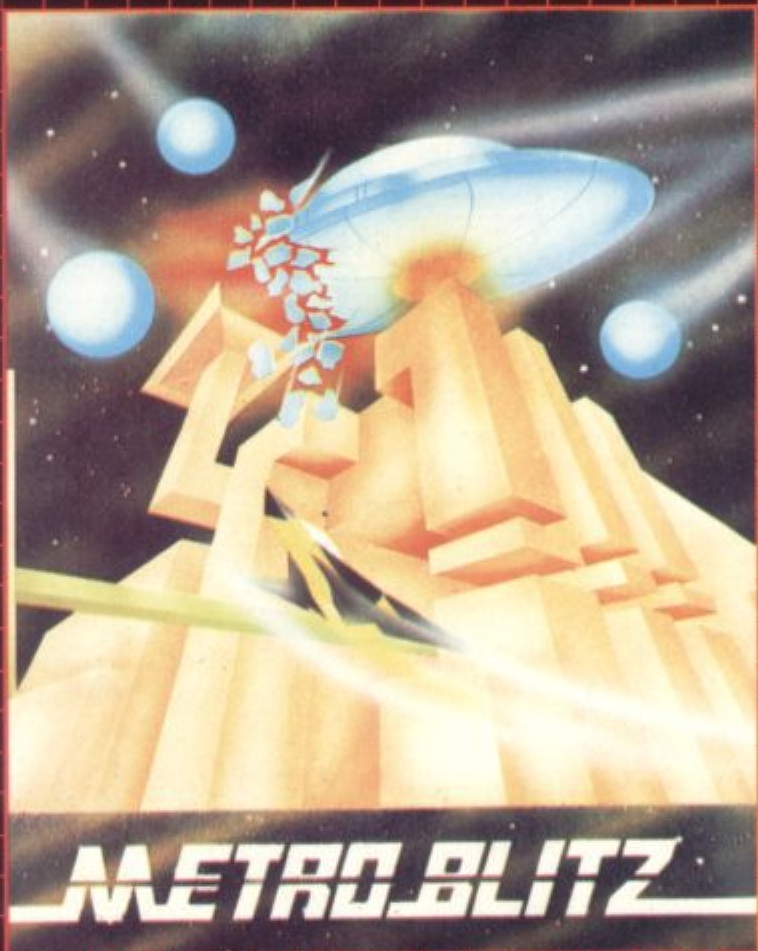
BIT: Performs the logical AND between the memory location and the Accumulator, indicating the result with the Zero flag in the status register. Suppose, for example, that bit 3 in the Accumulator is set to 1 and all the others are set to 0. The logical AND with the memory location will only

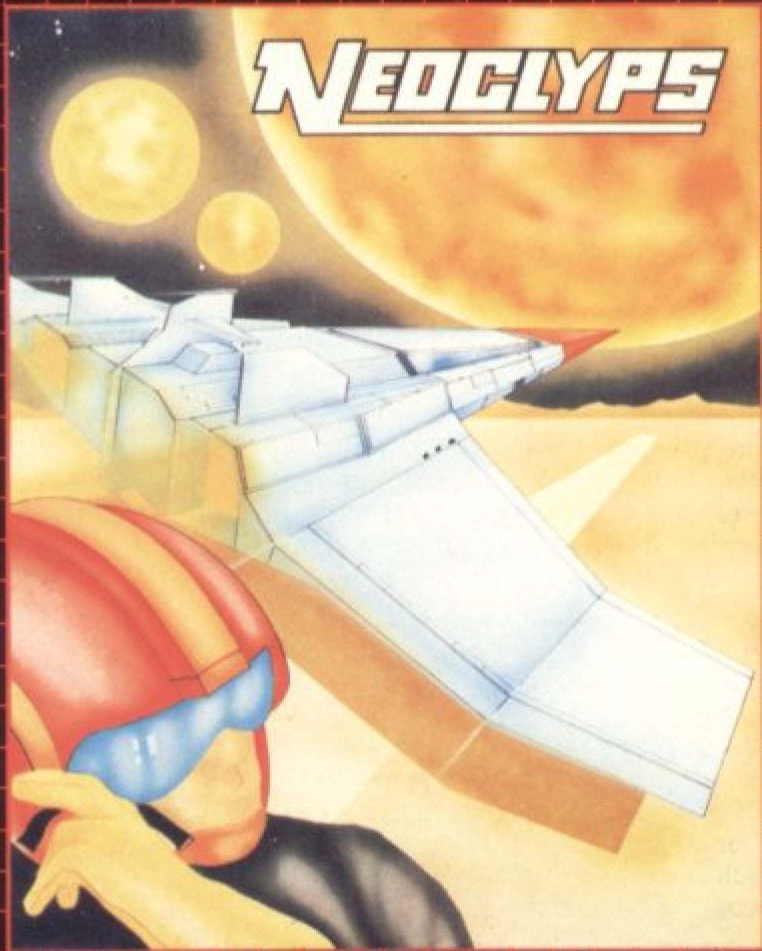


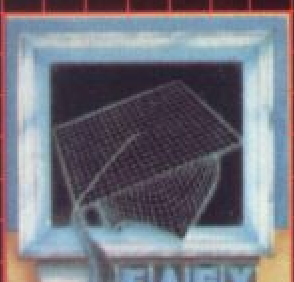
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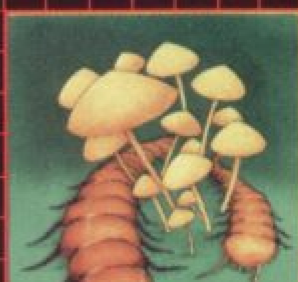
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produce a 1 if bit three of the memory location is also a 1. If the comparison succeeds, (i.e. bit three of the memory location is indeed 1) the zero flag is set to 1.

CMP: This instruction does not make a bit comparison but compares for equality, less than or greater than. The contents of the memory location are subtracted from those of the Accumulator and the N, Z and C flags affected accordingly. If N = 1, the contents of the memory location are greater than those of the accumulator. If Z = 1, the subtraction gave zero and so equality has been detected. If C = 1, the contents of the memory location are less than those of the Accumulator

CPX: This instruction operates in the same way as CMP, but for the X register instead of the Accumulator

CPY: This instruction also operates as CMP, but this time for the Y register instead of the Accumulator

Six increment and decrement instructions

These instructions simply increment or decrement the contents of a memory location of the X or Y registers by 1. They are useful when using counters in loops, for example.

INC: INCrement the contents of the memory location by 1
DEC: DECrement the contents of the memory location by 1
INX: INcrement the contents of the X register by 1
DEX: DEcrement the contents of the X register by 1
INY: INcrement the contents of the Y register by 1
DEY: DEcrement the contents of the Y register by 1

The last four instructions use the implied addressing mode and are thus one byte long. The first two can be two or three bytes long depending on the addressing mode.

Eight branch instructions

These instructions all use relative addressing and are two bytes long. They constitute the "decision making" instructions of a program: each tests the value of a flag in the status register, and cause the program to branch (or not to branch) accordingly.

BCC: Branch on Carry Clear (C =0)
BCS: Branch on Carry Set (C =1)
BEQ: Branch on EQual to zero (Z =1)
BNE: Branch on Not Equal to zero (Z =0)
BPL: Branch on PLus (N =1)
BMI: Branch on MInus (N =1)
BVC: Branch on oVerflow Clear (V =0)
BVS: Branch on oVerflow Set (V =1)

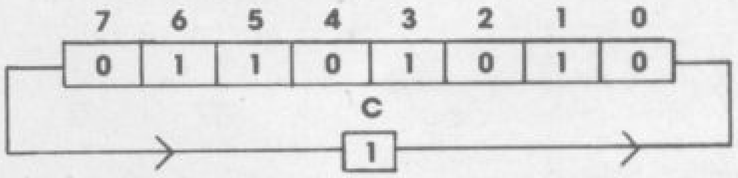
Nine arithmetic and logic instructions

This set enables the 6502 to perform all the required mathematical and logical operations. A variety of addressing modes can be used, resulting in the instructions being one, two or three bytes long. The next article will delve more deeply into the theory of addition, subtraction, multiplication and division and how to handle numbers which are larger than eight bits, but for now here is what these instructions do:

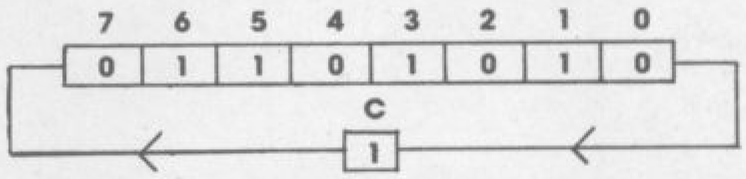
ADC: ADd with Carry adds the contents of a memory location to those of the Accumulator and the carry bit (the carry flag in the status register) and deposit the result in the Accumulator overwriting the original contents

SBC: SuBtract with Carry subtracts the contents of a memory location from those of the Accumulator with borrow and deposits the result in the Accumulator, again overwriting the original contents

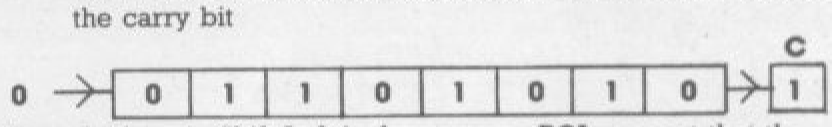
ROL: ROtate Left. Causes each bit in a memory location or the accumulator to be displaced one place to the left: the carry bit sets the new value of bit zero, and bit seven sets the new value of the carry bit



ROR: ROtate Right – the reverse version of ROL: the carry bit now sets the new value of bit seven and bit zero the new value of the carry bit



LSR: Logical Shift Right is the same as ROR, except that the new value of bit seven becomes zero and not the value of the carry bit



ASL: Arithmetic Shift Left is the same as ROL, except that the new value of bit zero becomes zero and not the value of the carry bit.



AND: Performs the logical AND between the contents of a memory location and those of the Accumulator, leaving the result in the Accumulator as follows:

		Accumulator Bit	
Memory Bit	0	0	1
	1	0	1
		1	1

This is useful if a certain bit is required to be set to one, whilst leaving the others unchanged.

1	1	0	0	0	0	0	0	Memory
0	0	0	0	0	1	0	0	Accumulator
1	1	0	0	0	1	0	0	Accumulator

ORA: Inclusive OR with Accumulator. Performs the logical OR of the contents of a memory location with those of the Accumulator, leaving the result in the Accumulator. The operation is performed bit by bit as follows:

		Accumulator Bit	
Memory Bit	0	0	1
	1	0	0
		0	1

This is useful if a certain bit is required to be set to zero, whilst leaving the rest unchanged

0	0	1	1	1	1	1	1	Memory
1	1	1	1	1	0	1	1	Accumulator
0	0	1	1	1	0	1	1	Accumulator

EOR: Exclusive OR with Accumulator. Performed the logical operation between the contents of a memory location and those of the Accumulator, leaving the result in the Accumulator:

		Accumulator Bit	
Memory Bit	0	0	1
	1	0	1
		1	0

So the result is only 1 if the bits are different. If the Accumulator bits are all set to '1', the result will be the complement of the memory location

1	0	1	0	1	0	1	0	Memory
1	1	1	1	1	1	1	1	Accumulator
0	1	0	1	0	1	0	1	Accumulator

Six control instructions

The control instructions are:

JSR: Jump to SubRoutine, which is just like GOSUB in BASIC and uses absolute addressing (therefore it's three bytes long)

RTS: ReTurn from Subroutine, which is just like RETURN in BASIC and uses implied addressing (therefore one byte long)

JMP: JuMP which is the assembly language equivalent of GOTO in BASIC, and three bytes long using absolute or indirect addressing

RTI: ReTurn from Interrupt – an interrupt request has been serviced and control is returning to the main program (more about interrupts in a future article)

BRK: BReaK is equivalent to STOP or END in BASIC, causing return to the Assembler

NOP: No OPeration does nothing! Why have it? There are two reasons: first, Assembler does not have line numbers like Basic; so new lines cannot be inserted. The program therefore may have to be entirely rewritten – unless the occasional NOP is present which can be overwritten by the instruction to be inserted. And second, it's handy for timing delays – just like FOR M =1 to 1000: NEXT M

Seven status flag control instructions

The following instructions either clear (make zero) or set (make one) the appropriate status flag. It is interesting to note the status flag which the programmer has no direct control over, by their absence from these instructions. All use implied addressing and are one byte long.

CLC: CLear the Carry flag
SEC: SEt the Carry flag
CLD: CLear the Decimal flag
SED: SEt the Decimal flag
CLI: CLear the Interrupt flag
SEI: SEt the Interrupt flag
CLV: CLear the oVerflow flag

The 6502 Instruction Set in Full

Six: Transfers between internal registers	ACC	IMP	IMM	REL	ABS	ZP	(IND)	ABS,X	ABS,Y	ZP,X	ZP,Y	(IND,X)	(IND),Y
TAX		AA											
TXA		8A											
TAY		A8											
TYA		98											
TSX		BA											
TXS		9A											

Six: Transfers betwen memory & registers	ACC	IMP	IMM	REL	ABS	ZP	(IND)	ABS,X	ABS,Y	ZP,X	ZP,Y	(IND,X)	(IND),Y
LDA			A9		AD	A5		BD	B9	B5		A1	B1
STA					8D	85		9D	99	95		81	91
LDX			A2		AE	A6			BE		B6		
STX					8E	86					96		
LDY			A0		AC	A4		BC		B4			
STY					8C	84				94			

Four: Transfers between stack & registers	ACC	IMP	IMM	REL	ABS	ZP	(IND)	ABS,X	ABS,Y	ZP,X	ZP,Y	(IND,X)	
PHA		48											
PLA		68											
PHP		08											
PLP		28											

Four: Comparison instructions	ACC	IMP	IMM	REL	ABS	ZP	(IND)	ABS,X	ABS,Y	ZP,X	ZP,Y	(IND,X)	(IND),Y
BIT					2C	24							
CMP			C9		CD	C5		DD	D9	D5		C1	D1
CPX			E0		EC	E4							
CPY			C0		CC	C4							

Poster design: David A. Pinless

Six: Increment & Decrement instructions	ACC	IMP	IMM	REL	ABS	ZP	(IND)	ABS,X	ABS,Y	ZP,X	ZP,Y	(IND,X)	(IND),Y
INC					EE	E6		FE		F6			
DEC					CE	C6		DE		D6			
INX		E8											
DEX		CA											
INY		C8											
DEY		88											

Eight: Branch instructions	ACC	IMP	IMM	REL	ABS	ZP	(IND)	ABS,X	ABS,Y	ZP,X	ZP,Y	(IND,X)	(IND),Y
BCC				90									
BCS				B0									
BEQ				F0									
BNE				D0									
BPL				10									
BMI				30									
BVC				50									
BVS				70									

Nine: Arithmetic & logic instructions	ACC	IMP	IMM	REL	ABS	ZP	(IND)	ABS,X	ABS,Y	ZP,X	ZP,Y	(IND,X)	(IND),Y
ADC			69		6D	65		7D	79	75		61	71
SBC			E9		ED	E5		FD	F9	F5		E1	F1
ROL	2A				2E	26		3E		36			
ROR	6A				6E	66		7E		76			
ASL	0A				0E	06		1E		16			
LSR	4A				4E	46		5E		56			
ORA			09		0D	05		1D	19	15		01	11
EOR			49		4D	45		5D	59	55		41	51
AND			29		2D	25		3D	39	35		21	31

Six: Control instructions	ACC	IMP	IMM	REL	ABS	ZP	(IND)	ABS,X	ABS,Y	ZP,X	ZP,Y	(IND,X)	(IND),Y
JSR					20								
RTS		60											
JMP					4C		6C						
RTI		40											
BRK		00											
NOP		EA											

Seven: Status flag control instructions	ACC	IMP	IMM	REL	ABS	ZP	(IND)	ABS,X	ABS,Y	ZP,X	ZP,Y	(IND,X)	(IND),Y
CLC		18											
SEC		38											
CLD		D8											
SED		F8											
CLI		58											
SEI		78											
CLV		B8											

Instant attachment

How we got into Interpod



by Simon Potter

The Vic and the 64 are small computers. That's not to say they are short on capability – far from it. But one of the design constraints in a low-cost mass-market volume-production 'home' computer will inevitably be that group of functions lumped together under the term 'input-output'.

In the case of the small Commodore machines, this has meant that it's difficult to plug in a non Commodore printer. It's difficult to use the built-in but non-standard RS232 interface for modems, terminals and printers: and there's no provision at all within the computer for the other *de facto* standard connection method for printers, the Centronics parallel interface.

Nor is it easy to plug in Commodore devices developed for its larger computers, the 8000s and 700s. They use a different form of the IEEE interface for attaching their disks and printers.

You can however buy adapters for the RS232, Centronics and IEEE interfaces – indeed, we've looked at some of them in the past. But Interpod claims to offer you two of them – 'true' IEEE and 'easy' RS232 – in one box. Does that justify the £99 price tag?

Interpod is described as "a dual interface". There's a DIN socket for the Vic or 64 – that takes the Serial Port cable you'd normally use to connect a disk drive or printer to the computer – and an identical duplicate which itself can take a Vic/64 disk or printer. Three other sockets provide for the power cord, a male RS232 connection and a male IEEE plug (in both cases Interpod has the female varieties built in).

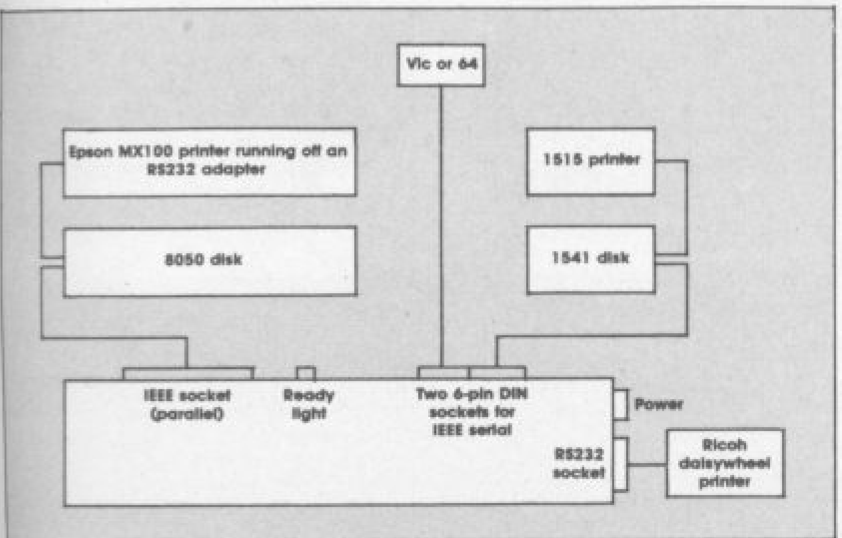
You can run this lot from the one Interpod:

- **one computer** (Vic or 64)
- **one RS232 device** (like a modem or a printer)
- **up to 30 IEEE devices** (which can mean 30 'serial' IEEE thingies – Vic/64 disks or printers: or 30 'parallel' IEEE devices – like PET disks or printers: or any number of each provided the total of *all* IEEE devices doesn't exceed 30).

Setting up

Interpod arrives in a deceptively large carton, most of which is the moulded polystyrene protection. Inside there's a small cream-coloured box, a mains adapter with a power transformer on it, and a couple of cables.

This was the test configuration we set up:



As you can see, the IEEE devices can be 'daisychained' in the standard Commodore way – via 'piggyback' plugs in the case of the Pet peripherals, via the 'spare' sockets in the back of Vic/64 devices. Either of the two IEEE serial sockets can be used for the host computer: Interpod doesn't seem to care.



There's also an 'End User Manual', a fold-out card that gives you six pages of neat, concise and comprehensive information. Like the rest of the parcel, the layout and design of the 'manual' could well set a standard for other suppliers to emulate ...

Setting things up was easy enough, especially if you can sink a natural distaste for the kind of spaghetti-style confusion of wires that Commodore owners will be familiar with.

As you can see, the IEEE devices can be 'daisychained' in the standard Commodore way – via 'piggyback' plugs in the case of the Pet peripherals, via the 'spare' sockets in the back of Vic/64 devices. Either of the two IEEE serial sockets can be used for the host computer: Interpod doesn't seem to care.

When you switch on, Interpod tests itself and the red 'ready' light should illuminate after about a second and a half. Ours didn't: "Failure to do so indicates a fault" says the User Manual helpfully. The Interpod itself feels very light and looks a bit lightweight: it rattled when shaken gently, too (Product Reviewers' Rule No. 1: Shake it, but not too hard).

Rattle plus no light equals fault, right? No. When we tried it everything ran perfectly. (Reviewers' Rule No. 2: Try it anyway.)

Using Interpod with IEEE devices

... is dead easy. Basically you just use the same logical file and device addressing commands as for an ordinary disk or printer – OPEN and CLOSE, LOAD, SAVE and VERIFY, PRINT#, CMD.

There's one small problem if you're using more than one device which would ordinarily have the same number – as we were with the 8050 and 1541 disks, both of which are normally device no. 8. In this event Interpod would ignore the parallel IEEE device altogether.

So you've got to change one of the device numbers. Fortunately that's not too difficult: and even better, the Manual gives sample programs that do it in four lines for both 1540/1541 and 4040/8050 (the latter presumably works for the 8250 too).

Interpod and RS232

Attaching an RS232 printer should not be difficult, either. Obviously you need the right sort of plug: and it must be wired appropriately. There are likely to be few problems, though, except

Command	Meaning
baud=(50,75,110,134.5,150, 300,600,1200,1800,2400, 3600)	set baud rate
parity=(odd, even, none)	set parity
chrsize=(7,8)	7 or 8 bits
crdelay=(on, off)	carriage return delay (¼sec.)
stopbits=(1,2)	select number of stop bits
break	send break
unbreak	release break
change	re-address INTERPOD's command channel and RS232 port
clear	clear buffer
convert	convert CBM ASCII to standard ASCII
unconvert	cancel CONVERT

Not all combinations of word length, stopbits and parity are catered for by INTERPOD. Only the following combinations are legal. Other combinations will give rise to an ATT ERR (attribute error).

7 Bits, Even Parity, 2 Stop Bits
7 Bits, Odd Parity, 2 Stop Bits
7 Bits, Even Parity, 1 Stop Bit
7 Bits, Odd Parity, 1 Stop Bit
8 Bits, 2 Stop Bits
8 Bits, 1 Stop Bit
8 Bits, Even Parity, 1 Stop Bit
8 Bits, Odd Parity, 1 Stop Bit

Table 1: Interpod settings

possibly with pins 2 and 3 (data in and out) and 5 (Clear to Send). Ours worked perfectly without modification.

Thereafter, using an RS232 device isn't much more complicated than IEEE. They don't have device numbers, which is why you can only attach one of them: and Interpod treats an RS232 device by default as device number 4, which is normally the IEEE printer.

That doesn't prevent you having an IEEE printer numbered 4 as well: it just means that the Commodore printer will get the output before Interpod checks whether anything's plugged into the RS232 socket.

If you want both types of printer – IEEE and RS232 – you can change the RS232 device number. There's a whole set of commands you can use to set up the RS232 channel, in fact, because there's so much variety possible with RS232. The table gives the full list – and very full it is, too.

In fact the default settings are pretty well chosen. We had to alter nothing at all for our Ricoh (except an automatic line feed on/off switch on the printer.) For a trial on an Epson we again found it easier to move the printer's own DIP-switch settings to suit the Interpod defaults.

Thereafter it was simple to print – OPEN 4,4: CMD 4: LIST: CLOSE 4 to produce the program listings we're now using for most Victuals, for instance. (Incidentally we can't do *all* Victuals on the daisywheel because it won't handle the Commodore graphics some programs feature.)

To print from a program is also easy enough, with the usual OPEN 4,4 and PRINT#4 command. Sending the CHR$ printer controls produced a few odd effects, of course, when they related to functions available only on the Vic-1515 or 1525 printers. But all ASCII controls worked well enough.

Errors and CLEAR

You can check Interpod's status with an OPEN command to device number 4, secondary address 31. You pick your own logical file number – 6, say – and give the command ...

OPEN 6,4,31: INPUT#6, e$: CLOSE 6: PRINTe$

The CLEAR command is provided to handle a couple of funnies that may occur if you're running IEEE instruments from Interpod – if their output isn't accessed sequentially the communication may contain "unsolicited characters".

The CLEAR is easy enough to use – assuming you've OPENed 6,4,31 you can PRINT#6, "clear"; CHR$(d); CHR$(s) ... where 'd' is the device number and 's' the secondary address. We weren't able to check this out ourselves but we spoke to a school lab technician who uses it regularly and satisfactorily.

Conclusions

Interpod is neat, compact, comprehensible and sensible. Major plus points – it's easy to use and it's effective. It does attach an RS232 device simply and with few hassles: it does attach multiple IEEE devices, both serial and parallel, in a manner that should gladden the heart of anyone with Pet peripherals that could be used on a Vic or 64.

On the other hand, there's the rattle. True, our unit did work: but a tougher case would have been preferable. (we'll do a kind of 10,000-mile road test on Interpod in a few months and let you know how it's faring.)

Two obvious omissions in the spec probably came into the lily-gilding price-raising category. But we'd have liked a Centronics interface to be included as well, to make Interpod genuinely an all-purpose printer adapter. And a bit of RAM inside to provide a print buffer wouldn't have gone amiss: most low-cost printers have only a small buffer themselves, and if there's a lot to be printed it can take a while before the Interpod lets you have the Vic or 64 back again.

Interpod as it stands is a well-thought-out product. We especially like the helpful extras – the CLOSE command for IEEE oddities, for instance: the way the error channel can be read (even though the two error status messages are less than comprehensive): the CONVERT command to switch from Commodore's version of ASCII to a conventional one.

On balance – a good buy if you can usefully run Pet devices and RS232. Probably a good buy if you want only the IEEE facilities. Not so great if it's only the RS232 you're keen on.

No.	Message	Meaning
1	ixxx	Power up message, xxx is issue number
2	ok	This message indicates the absence of any error condition
3	cmd err	The last command issued to INTERPOD was not understood
4	att err	Illegal combination of parity, stopbits and character size

Table 2: messages in e$

Under review:	Interpod
Description:	IEEE/RS232 adapter for Vic or 64
Supplier	Oxford Computer Systems Hensington Road, Woodstock, Oxon OX7 1JR 0993 812 700
Summary	No major limitations – a good buy if you have Pet peripherals
Price:	£99

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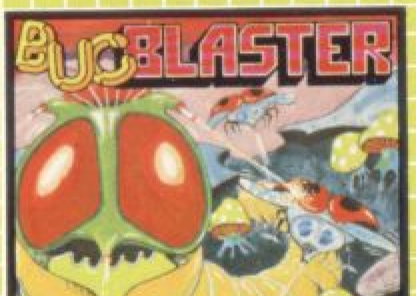
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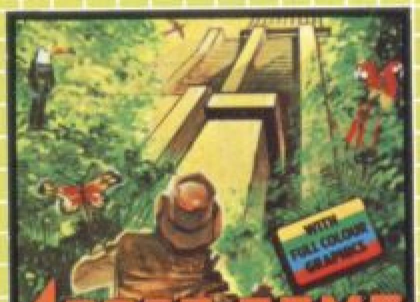
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Part One appears below. It's a simple quiz; put your answers on a separate sheet of paper, cut out the coupon, and keep the two items somewhere safe. Part Two will be in the March issue; Part Three and the Entry Form appear in April.

PART ONE: THE £1,000 QUESTIONS

1. What is the name and country of birth of Commodore's heavyweight founder?

2. a) What did Dorr E Felt build in 1884 using meat skewers, rubber bands, staples and a wooden macaroni box?
   b) Approximately when was the abacus invented?
   c) Babbage designed two 'computers' – which one got built (more or less)?

3. What do these acronyms stand for?
   a MOSFET
   b EPROM
   c DIP
   d PET
   e SID
   f VIC
   g IEEE
   h ADSR

4. If you add 1 and 1 together and get 10, you're either lousy at maths or you've got it right. Why?

5. And if 1 and 1 make 1, you're either lousy at maths or you're using a special form of algebra. What's it called?

6. Who designed the Pet? Was it:
   a Steve Jobs
   b Chuck Peddle
   c Bobby Moore
   d Jack Tramiel
   e none of these

7. What was the first thing Commodore manufactured? Was it:
   a the Pet
   b an office desk
   c a scientific calculator
   d a typewriter
   e the Vic

8. Can you list three fruity and one nutty computers?

9. If a computer is described as 'dedicated', does it:
   a like you very much
   b perform only one task
   c spend a lot of time at Greenham Common
   d perform only for one person
   e perform only once

10. Commodore has a Vic and 64 manufacturing plant in Britain. Where is it?

11. If black and blue is 14, what's blue and black?

12. Who wrote 'Gridrunner'?

13. There's a computer language called Ada. Is it ...
    a an acronym? If so, what does it stand for?
    b named after someone? If so, whom?

14. What are the alternative names of the Timex T1000 and T2000?

15. What does 'atari' mean?

16. How do you put a tick on to a Vic or 64 screen *in direct mode*?

17. Spot the deliberate mistake and solve the possible INPUT problem in this clock display routine:

```
100 INPUT "HOURS": H$
110 INPUT "MINUTES": M$
120 TI=H$+M$+"00"
130 PRINT "TIME="LEFT$(TI$,2):":":
    MID$(TI$,3,2):":":RIGHT$(TI$,2)
140 GOTO 100
```

18. What in theory is the maximum number of all types of variables that you can have on a Vic or 64?

19. Which new home computer would you expect Captain Kirk or Mr. Spock to use?

20. Are there any real operating systems in the list of names below? If so, which one(s) are they?
    a TRSDOS
    b DOMES-DOS
    c CP/M-140
    d UCSD b-system
    e Zenix

£1,000 COMPETITION

PART ONE

Mr. Chip

SOFTWARE

COMMODORE 64 GAMES AND UTILITIES	VIC 20 GAMES AND UTILITIES

COMMODORE 64 GAMES AND UTILITIES

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Write away

This is your page: normally we write for you, but here we listen. Feel free to let us know what you think – about the magazine, about Commodore, about suppliers, about life, art, the meaning of existence or whatever. We don't print everything we receive, of course; but anything that might be of specific relevance or general interest will make it to these pages.

Technical matters get passed to Tommy for eventual emergence on the Tommy's Tips pages. But anything else ends up here. Address your comments, complaints, queries and congratulations to The Editor, Commodore User.

Write of reply

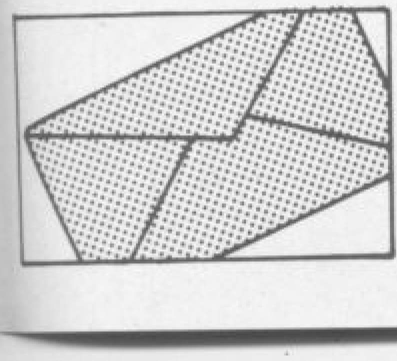
Some of your correspondents almost seem to want **C.U.** to guide them through life. It cannot be the mag's function to act as a major tutorial: supplying handy tips and wrinkles with an insight into technical matters, yes.

I bought a computer for mental stimulation and proceeding at a genteel pace (it's a long time since my school days) worked through *Introduction to Basic* – gaining, after two volumes, an insight into the Black Art. Only the first rung, perhaps, with much brain-racking along the way; but then that was the object of the exercise. Machine-code beckons and I'm sure **C.U.** will assist me with this, but I don't expect every facet of it to be pre-digested. Again specialist courses are available as advertised!

As for the general contents of the mag, some issues must appeal more than others according to an individual's preference and current needs. I anticipate every issue – but I don't expect it to be perfect.

As a reply to a correspondent who felt there to be something unsavoury about arcade games, it should be pointed out that interactive simulations demanding quick reflexes are considered to be therapeutic. I can see not vicarious violence or mayhem by proxy. Let's appreciate the programmer's skill and clever graphic effects. Finally, isn't chess based on warfare?

L Samson, 19 Kempton Avenue, Hornchurch, Essex.



Simply Write rewritten?

I was surprised to read your review of *Simply Write* (November 1983), which seemed to find fault with it chiefly and repetitively on the grounds of lack of disk error messages. The program has always had full disk error signalling, and we cannot understand how your reviewer has received a copy without it. If any reader has also received a copy which does not send disk error messages, we shall be happy to exchange the disk.

There are some other oddities in the review, too. It is simply not true that "the words wrap around at the edge of the screen". An occasional long word will do so, to make the best use of limited screen width. The vast majority are moved on to the next screen line if they would otherwise be split. In the entire length of this letter, about 100 screen lines, only three words are split on the screen.

We have not received any reports of inability to send control characters to any type of printer. One of the features of this program is that it can be used so easily with a wide variety of printers when upgrading. To ensure this, control characters are not automatically accompanied by a carriage return when sent. Perhaps your reviewer did not send an accompanying carriage return as required by his Epson printer? We have encountered no difficulty in using the program with our Diablo and Epson printers. Keys can also be redefined to send any character (we use the shifted zero as an ESC key). Regarding the problem of editing control characters, if your reviewer had just looked in the index, he would have found the entries for 'Control Characters' and 'Editing Control Characters', p24.

The disk directory can be read quite easily, with no loss of program or text, by using the normal *C-64 Wedge* program supplied with the 1541 disk drive. Details are given in the manual. we saw no point in duplicating that facility, as it co-exists happily with *Simply Write*, even when using a separate Centronics parallel software interface such as the one available from Audiogenics.

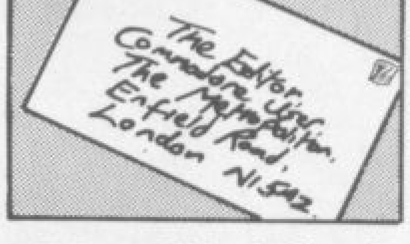
In addition, the current *Simply Write for 64* program includes a built-in Centronics interface, which loads with the program. This is less bother than a separate one. We saw this step as helpful rather than necessary as implied by your reviewer, though. The user of the parallel printer will not have been able even to list, etc., unless he already had a separate interface of some kind.

In view of the harm that can be done to a popular program by adverse comment, we hope that you will feel able to print these notes. We have a great many happy users of this low-cost, versatile program. One might fairly say that not being at the sharp edge of technology is what it is about. As the name of our company is intended to suggest, ease of use is a main consideration. We use 'Simply Write' for our own business correspondence as well as documentation. The three-week training course apparently needed for some of the more expensive offerings gives us little temptation to change, even though we have them here for sale. A surprising number of our users also tell us they have a more expensive word processor available but rarely use it.

Brian Tregar, Simple Software, 15 Havelock Road, Brighton BN1 6GL

Reviewer Chris Durham responds:

In reply to Simple Software I would point out that after closely examining the listings of the original review copy and their current version, I noted a number of changes, some of



which are additional calls on the disk error checking routine.

I have run the latest version and find that it does now have full disk error checking. This is indeed welcome news and would remove all the criticisms relating to this problem in the article.

Unfortunately, reviewers do not have crystal balls: and we can only review the programs as they are received. Unless companies tell us of changes, they should not complain if we find the errors they have already corrected in later versions.

I agree only long words are split, but when I typed my 'test piece' it contained lots of large words. I apologise if I misled by not making it clear that only some words wraparound.

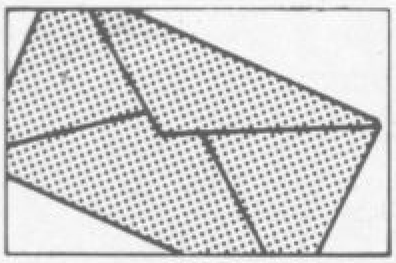
Regarding the printer codes, Mr Tregar is in error when he says the Epson FX-80 printer requires a CR after a control character. I have tried yet again with the latest version of *Simply Write*; some codes work, some don't. And I *still* get asterisks instead of spaces after redefining the keyboard.

As for editing lines containing control codes, mentioning it in the manual still doesn't make it any easier to do!

And on the directory, what Simple Software seem to forget is that anyone with a 1540 drive (with ROM upgrade) will not have access to the C-64 Wedge program. How do *they* read the directory?

I applaud the changes made to *Simply Write*; with a Centronics interface and full disk error handling it is now a better buy than the version I reviewed ...

Letters



Function keys

In the October issue of **Commodore User**, you printed the machine-code part of FUNCTION KEYS – but not the Basic part! Enclosed is a listing of the Basic.

There is also an error in the disassembly: by the side of the comment 'increment indices' you have printed INY INY. This should of course by INY INX. Note that the strings are stored in the cassette buffer, so if you use the cassette then the strings will be destroyed: and any attempt to use the function keys will cause the Vic to crash.

Both the program and my M-C TO DATA program are in my book *Vic-20 Mindstretchers*, published by Sigma Technical Press and coming out soon.

Can someone tell me why I can't load Vic programs onto my Commodore-64?

Ian Creasey, 182 Didsbury Road, Stockport, Cheshire SK4 2AA

Oops – Basic loader printed here. As for the query about loading Vic programs on to a 64, presumably the problems aren't with *RUNning*them; it's laborious but not impossible to pick out the POKEs and SYS calls that will and won't work. If the problem is simply that tapes produced on the Vic won't load on a Vic, it could be a timing problem: we understand the 64 is clocked at 1.1MHz, the Vic at 0.98MHz – and since the clock controls the tape deck pulses, the difference may be too great for the tape handler.

Solution? Really awkward: about the best we can suggest is that you find a Pet, which is clocked at 1MHz dead. The difference between 0.98 and 1.0 isn't large enough to cause read problems, so you could load the Vic-generated cassette into a Pet; and since that also applies to the difference between 1.0 and 1.1MHz, a cassette produced subsequently on the Pet shpuld load ok on a 64.

Will RUN forever

I have a routine which will reconfigurate the Vic so that Basic or Machine-code programs written for the 3K or unexpanded Vic can be run on the 8K or 16K Vic.

Don't believe me, huh? Readers who do read on: the people who don't can go and buy a 3K rampack (only joking).

The routine is not really mine but I discovered that it worked with the 8K and 16K Vic. The routine was from 'Todd's Lore' (*All about memory*) in June 1983. Near the end he had a routine which reconfigured the Vic so that 3K and Unexpanded programs can be run even with the Super Expander in place. So I used it with my 16K expanded Vic and it worked.

Here's the routine:

POKE 648,30: POKE 642,32: SYS 64824

It will work only if you remove all POKE 50, 51, 52 ... etc.

Happy configurating!

Steven Tam, 127 Brodie Avenue, Mossley Hill, Liverpool L18 4RG.

Cross Maltese

I would first like to congratulate you on your article in the Christmas issue of **Commodore User** which was nothing short of excellent. To my disappointment, however, you failed to mention the disease invariably suffered by inhabitants of the colonial outposts such as Malta.

Unfortunately, this disease has not yet been named. It is usually preceded by a night-long reading of **Commodore User** accompanied by very wistful glances at the advertisements. The first symptom of the disease is a rush to the Customs' Office, with outward signs resembling those of "Clenched Fist" ('bruising on the side of the hand ... patchy hair loss') on hearing that an import licence is required for any order above £M25 (about £37.5 Sterling). The second stage is usually a spate of frantic phone calls to the local Commodore agents, followed by a period of depression on hearing the usual: "Sorry, nothing in stock yet. Try next week."

The victim is often brought close to asphyxiation by the words on

advertisements which read: "This offer applies to UK residents only".

Governments and Import Agents are warned that a delay of longer than three months in delivering a new computer can be fatal to a true-blue buff while the absolute impossibility of buying a computer 'off the shelf' has more than once led to a not-too-subdued rebellion – for example the release of the CBM 64 in Britain while none were freely available here (they still aren't!)

Possible cure: a rapid drop in airline fares and a CBM shop at Heathrow airport to enable buffs to shuttle to and fro as much as possible!

May I add that this disease does have one positive aspect – it leads to very high scorers at all games; since most buffs here don't have more than the original two or three purchased with the computer! Have a wonderfully Orwellian 1984.

Rosa Vella-Briffa, Villa Calrose, Marina Street, Pietà, Malta G.C.

Poms away

Your 'rest of the world' subscription at £32 (about A$64) is almost prohibative, seeing I can get *Compute* airmailed here for A$41. The dealer from whom I bought this year's subscription is closing down, so I'll have to subscribe direct with you ...

Bruce W Fairhall, Public School, Lindsay Street 18, Blayney, 2799 NSW, Australia.

Look, it's not our fault – it's all part of the British Post Office's xenophobic desire to prevent anyone who isn't in the supertax bracket sending anything outside Britain. Like airmail to Australia costs us a minimum of £1.42 per copy, or £16.98 for a twelve-issue annual subscription. Add that to the UK price of £12 and your just short of £29. That's the lightest size of the issue we produce. And if we do a slightly larger issue, the total goes over £32. And the postal rates are going up this year – but we'll be committed to servicing subscribers at the old rate.

We could short-circuit all that by finding a local agent to whom we'd ship in bulk (which *is* cheap, because it's done as air-freight and not as mail) for local distribution. And we are looking: but if there's anyone out there who's interested, give us a call ...

Restoritis

Upon reading your article on computer diseases in the December **Commodore User** I noticed an important exception, namely Restoritis (a disease that I was afflicted with until I used the treatment suggested). I hope Dr Buttertodd will add this to his files and continue to diagnose computer diseases and help both the buff and the novice survive.

Restoritis: A common disease with programmers that write musical and hi-res (user-defined) programs. Symptoms are blisters on the left hand thumb and jarred right hand fingers. Possible cures are purchase of the Super-Expander or Programmer's Aid cartridges; these enable the programmer to define the function keys eg. KEY2 "POKE36876,0"

Simon Rees, 5 Sladesbrook Close, Bradford-on-Avon, Wiltshire BA15 1TD

Dr Buttertodd writes: A most interesting malady, and once again a most effective demonstration of the efficacy of applying quantities of pound notes to the problem site.

Write on

I think it is a good idea if you published a section in your magazine where people could send in their names and addresses who would like 'pen-friends' with Vic-20's.

They could swap information and programs or even talk to each other through acoustic couplers.

Don't you think that this is a good idea? If you decide to print it, please put my name down.

M. Hinks, 4 Chilton Drive, Higham, Rochester, Kent, ME3 7BW.

OK, we'll do it. Any entrants for a 'Pen Pals' column?



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Unexpanded Vic 20. "Invader Numbers". Teaches children 2-6, numerical keys, counting, addition, subtraction. + Expander, analogue clock. Both inc p&p £5.00. S Belshaw, 11 Station Road, Lundwood, Barnsley S71 5LA.

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